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LEAD FOR LINING TEA CHESTS.

A considerable amount of discussion has of late taken place as to how far it may be possible to substitute various forms of linings for tea chests in lieu of the lead which has almost from time immemorial, been used for that purpose. The objections that may be taken to the use of lead for this purpose are many and various. Chief among these is the item of cost, and, scarcely secondary to that, the weight for which land carriage both up to the estates and down to the port of shipment has to be paid. There are those who further maintain that lead packing for any articles of an alimentary nature is to be deprecated, it being urged that, although in a degree insensible to observation, the introduction of a certain amount of lead poisoning most injurious to human system, may be due to the practice.

We may, we believe, leave this last objection out of consideration; for although we do not deny that the contact of lead with food destined for human consumption is injurious, we doubt exceedingly if it has been proved that the tea packed in lead linings has ever imbibed from it any deleterious quality. The two first objections we have mentioned are, however, of gravity fully sufficient to justify the desire felt for the provision of some efficient substitute for these lead linings, for they are—all experience teaches us—not only weighty, but sometimes costly and troublesome to prepare. On this account alone we have welcomed, and are yet prepared to welcome, any suggestion likely to be of effect in offering an efficient substitute for lead. Of late, reports reaching us as to the satisfactory results of shipments made in lead paper, as also in artificial parchment, would seem to have indicated that such a substitute had been found. But the mention made in our London Letter by last mail of a recent experience must compel us as yet to suspend a favourable judgment on this point. We are told that an expert tea-taster of eminence was able to at once pronounce, not alone as to the material used for enveloping the tea submitted to his judgment, but even as to the character of the enclosing chest. Such a result can have but a single meaning, viz., that the lining—in the case under notice, lead paper—was not impervious, and that it had permitted to pass through it and to be absorbed by the tea some inherent taint in the material of which the chest was composed.

Confirmation as to this has been supplied to us from other correspondence, which asserted that several of these lead-coated paper linings, when examined after receipt at home, were found to be perforated with innumerable small holes, the fact leading to the conclusion that the film of metal placed upon the paper had been too thin to resist the action of the acids exuding from the material of the chests, though, the perforation being so minute, they might have been caused by the action of damp alone. But it matters little how minute these perforations were. They may not have been as "deep as a well nor as wide as a church door"—to quote Shakespeare,—but what they lacked in size they made up for by their number, and it must be evident that any lining liable to become so affected must be untrustworthy, and that its use is therefore out of the question when so much of financial return to our planters is dependent on their produce reaching its several markets in a perfectly sound state. We learn from home that the fact of failure is fully recognized by those who have hitherto made trial of this proposed substitute for lead, and that they will abandon the further use of it.

We may conclude, therefore, that as yet what we require has not been found, and that we shall do wisely for the present to stick to our old and well-tried lead linings, however weighty the objections to their use may be. But our London Correspondent has sent to us by the mail a specimen of a newly-manufactured material on the possible success of which some hopes may be built. It would seem that, while sheet lead such as we use at present is unnecessarily thick and heavy, the leaded paper errs in the other extreme, that of the film of the metal being too thin. Possibly, therefore, a remedy is to be found in some material which shall provide the *juste milieu.* This the specimen of lead foil—as it is termed—that has been sent to us seems to provide. It apparently has body enough to resist the action of either a moderate amount of acid or of damp, while the paper lining added to it—if, indeed, it be paper—would prevent any contact between the tea and the lead. It is said to have the further

useful quality of uniting closely when a heated iron is simply passed over it, and our correspondent tells us that he has seen the edges of two pieces of this material so united. This facility will be much appreciated when it is compared with the labour of soldering the ordinary lead lining. Trial shipments are, we are told, to be made with this lead foil, and we hope they may have successful results. "When one door shuts another opens" goes the old saying, and we should welcome the assurance that we have to give up the hopes entertained of several lead papers hitherto tried, we may have the alternative before us of another possible solution to the difficulty our tea-growers now experience.

ANOTHER CASE OF THEFT OF CACAO FROM THE WARIAPOLA ESTATE; MATALE.

R. S. Fraser of Wariapola, Complainant, *vs.* Bandia of Hapuwida, Defendant.

CHARGE.—That the defendant did commit theft of five cacao pods (unripe) of the value of R1·25 property of complainant.

ROBERT SCARLETT FRASER sworn.—This accused was caught stealing in my cacao garden. His father was convicted of stealing cacao in my garden and was sent to jail for six months. The accused pleaded guilty and stated that he was drunk and did not know what he was doing. [The learned Magistrate thought it best to examine Mr. Fraser as to the story of the accused of being drunk. I saw the accused soon after he was caught. My conductor and watcher caught him. He lives in a block of land adjoining my cacao fields, but there is a paddy-field intervening at one end. He was not drunk in the least when he was brought up, though at times he simulated drunkenness. When he had occasion to speak, he spoke very freely. There was no smell of liquor on him. He walked perfectly freely and spoke freely and when standing stood perfectly steady but kept his eyes closed. Cacao is constantly stolen from my estate without any trace of the thieves.

JUDGMENT.—I find the accused guilty under the 368th clause of the Ceylon Penal Code. The cacao produced is perfectly unripe cacao; and though the value is not great the extreme prevalence of the offence in Wariapola demands the highest punishment I can give. I find the accused guilty and sentence him to undergo rigorous imprisonment for a term of six months.—(Signed) J. H. EATON, P. M. Dec. 29th, 1890.

In the case wherein Mr. W. S. Marshall, the superintendent of the Vicarton estate, charged his kanakapulle, Supaiyah, with neglect of duty and disobedience of orders, the accused was sentenced on both counts to two months' rigorous imprisonment. The accused has given notice of appeal. Full particulars will follow.

MR. SCOTT BLACKLAW ON BRAZIL.

CASABRANCA—COFFEE CULTIVATION—A HEAVY BEARING ESTATE—THE COLONISTS AND THEIR WAGES—MOCOCA BRANCH OF RAILWAY—PROVISIONS—SAO JOSE—END OF THE RAILWAY JOURNEY—TRAVELLING ON MULEBACK—TROLLIES—ROADS—AN ADVANCING TOWN—"COMETS"—RIO PARDO—GUAXUPE—LABOUR SUPPLY—GOVERNMENT ELECTIONS—THE EMPEROR'S PALACE—THE PROVISIONAL GOVERNMENT—EXCHANGE.

Rio, Nov. 2nd.

Casabranca is a considerable town on the Mogyana Railway, 171 miles by rail from Sao Paulo. Coffee planting was begun here about 1878, and as formerly mentioned the principal pioneers here were the Prados. The Fazenda of Antonio Prado, late minister of Agriculture, is not far from the town. I have mentioned that coffee is only planted on high lands, that is on lands at four or five hundred feet above the level of the surrounding country. Unless planted on these, coffee gets killed by the yearly visitations of frost in the cold months, extending from May to September. This Fazenda, named Santa Veridiana, has thus a commanding aspect, and the green hills closely covered with coffee trees are seen from a long distance. There is over a thousand acres in coffee, and the cultivation is entirely done by European colonists, Germans, Italians, and Portuguese. Each colonist family is given a solidly built house covered with tiles, and is also given pasture for cows and land, outside of the patch of coffee which is set apart for each family to treat,—to plant provisions. As this is a heavy bearing estate, seldom giving less than ten cwt. per acre, and as the colonist is paid according to the quantity of coffee picked, it is very popular amongst colonists. Judging by the number of houses one sees from the railway there cannot be less than 100 families. In good bearing coffee, a colonist family of five persons will pick from 1,200 to 1,500 boxes, of 50 litres each, in one season. The price paid to the colonist is twenty pence (1s 8d or 800 reis) for each box of 50 litres (nearly a bushel and a half) of cherry. They have also the produce of the land, which each family cultivates for growing provisions. While they make butter and cheese, which they sell in the town, they also rear fowls, fatten pigs, and indeed each in himself is a farmer on a small scale. If the mother be thrifty the family can be kept from the provision-growing and and house alone, and the £130 or so received for coffee picked and weeded is saved money. Many of the colonists on this estate are rich and have money out at interest. This year (1889) the coffee estates along here are giving a heavy crop, but as the season has been a dry one all over the country, next year's crop will be a light one, as there have not been rains to send out young wood for the October blossoming season.

The most of the estates here are in good order, but it is said they are shorthanded for crops this year (1889) and a good deal of coffee will be lost and if not lost much will be gathered from under the trees and thus give an inferior quality. There are many more large coffee estates near Casabranca, From here the main line goes on to Ribeiro Preto direct west, and a branch goes north-west to Mococa, on the boundary between S. Paulo and Minas.

As our journey at present goes by the last named branch we will notice it first. Starting from Sao Paulo at 6 a.m. we arrive by train at Casabranca at 2·30 p.m., having travelled at the rate of 20 miles an hour including stoppages. I pity the traveller who has not taken something to eat with him, for there is such a confusion when changing at Campinas—from the 5ft. 3in. gauge to the 3ft. 3½in.—that he has no time to eat anything there, and the Portuguese sausages which one sees for sale at some of the stations are suggestive of grease, fat pork, and garlic, a kind of food which the average Briton cannot stomach. Some of our sandwich loaf, however, remained. All the same we were glad when arriving at Casabranca to be told that there was time for the passengers going by the "Mococa" branch to have dinner. The black-beans, rice, beef steak, and fowl, the last two being the only kind of cooked food from which the strong flavouring bulb I have mentioned is excluded, were ravenously eaten by us, and our Brazilian fellow-passengers had a fair "set to" at the joint of fat pork, mixing in their black-beans a cooked farinha made of Indian corn. If I can remember I may describe the way of making this baked flour later on.

A two hours' ride on the train takes us to Sao Jose do Rio Pardo. This part of the line goes principally through far-stretching campos covered with illuk grass, and in some places studded with small stunted trees, of a kind which seems to resist the action of the yearly fires, for every dry season these campos are set on fire if not by accident then out of pure mischief. There are however some stock farmers who believe in the yearly burning doing good, as cattle, horses and sheep greedily eat the young grass which seems to shoot up even without rain. The ground however

after this process of burning every year becomes dry and sandy, the sand being left lying between tho tufts of grass, while any organic part of the soil surviving the roasting is washed away.

It is a relief now and then to come to a hilly part where coffee can be grown, and we pass on the way some very fine coffoe estates, some only coming into bearing and all having large clearings of young coffee, and large villages of European colonists' houses (mostly Italians). In about two hours we reach the town of Sao Jose de Rio Pardo, having passed two small stations among coffeo estates. From Casabranca we have come in a north-easterly direction, and our journey ends here at Sao Jose as far as railway travolling goes. Wo have now for tho rest of our route to proceed on mule-back.

Before leaving Rio we had been directed to the hotel kept by Senhor Ananias, and the proprietor was himself at the station on the ontlook for "Hospedes" for his establishment: more than that, he had a conveyance called a trolly to take them, aud a mule cart to carry the luggage to the hotel. I think I have on former occasions described a trolly. It is not a Brazilian invention, but was introduced by some American contractor in the days when railways were young, adapting the idea from similar vehicles used for many years in the hilly parts of the Northern States of the American Union. It consists of four wheels on the axles of which are laid two eight inch boards ou the flat, these act as springs, on them are fixed seats cross-wise for holding two oach seat; some have two of theso seats and some three: indeed they can be made with auy number of cross seats by adopting longer boards, and extending the wheel-base. The boards or (springs are of a timber called *Cabriuva*, or *Balsama* the latter name because the wood emits a strong agreeable scent, and a balsamic liquid is extracted for medicinal and surgery purposes) and are very strong: I have never heard of a case of any of them breaking. To allow for turning the boards are put closer together on tho foreaxle, through which goes a strong bolt; to the foreaxle to which is also attached the pole, for two or more mules; or the shafts if for one.

You will notice that this arrangement does not give much play to the lock in turning, and the unwary driver if he makes a quick turn and the inside wheel in turning catches on the board-spring, he may upset the "trap" and bring its living freight to the ground. If the trolly has to turn right round on a road the occupants must all come out, and the driver will then lift the hinder part to one side, that is to say he will himself turn it end for end, which he can easily do, as when empty the whole thing is very light; so in this way it can be turned completely round on a narrow road.

When tho writer came first to Brazil there were not many of these conveyances, and they looked very rudely mado articles; any paint they had was engrained with mud or dust. But now, iu the country-towns, trolly-making is a profession, and professional painters "do them up" with paint and varuish in a sort of artistic manner, and the trolly gets a good washing every day it is used. A nicely done-up trolly with seats for four will cost £40. My estate carpenter—a Scotchman—made me one to my own design, and I paid for the ironwork alone to a professional trolly maker £15.

In the trolly in which we were conveyed to the hotel there was yoked to it a large horse, a sort of kangaroo breed. All its action seemed to be in the hinder quarters, and as the only pace the animal had was a gallop, he took us through tho steep streets by genuine "leaps and bounds." And such streets—laid out on the face of a hill! About a hundred yards near the railway was flat, and a large square on which were situated the church and the jail was noarly so, but all the rest of the streets were at a gradient of ono in three, or not to exaggerate thoy were like what "Willie Gordon" of Oodasgeria would call the "good old one in fivo." This was not the greatest objection to them, they were innocent of paving—although any quantity of workable granite peeped through the sides of tho hills near the town—and the heavy rains had made them full of ditches, ruts would be a mild name. Sometimes the axle of tho forewheels of the trolly would be at 35 degrees with the horizen while the hind wheels would be nearly on a level. Although they have not got farther in Sao Joso than a one-horse trolly, the citizens would be very much offended if a stranger called it "a one-horso town," for here is a centre of republicanism, aud discussions go so high some times as to defy the authorities to keep the peace, and now (Sept. 1889) there is a detachment of soldiers, which had been sent up not long ago to keep the outrageous spirits within legal bounds. We learned through conversations with "mine host" and others, that the same Ananias who was driving the kangaroo horse was a rank republican aud more so a decided socialist. He good-naturedly stated his opinion, and with a prophetic inspiration declared the monarchy doomed.

Senr. Anauias made us very comfortable at his hotel, gave us clean rooms and good food, but laughed at the idea of our thinking it possible to hire mules to continue our journey the next day. "No, no, senhores, we are an advanced people, but we must not be hurried. There are mules to be hired, but you must wait a day and then start at five next morning."

Next day we had an opportunity of noticing that Sao Jose was really advancing, new houses were springing up in all directions. The railway has been opened only for one year, and before it was projected there very few houses and population could not be countod above 300. I should say thore were now 3,000 inhabitants. The bulk of the population is Italian, and the storekeepers, a great many of whom in addition to their *Casas de negocio* (retail shops) add that of *Mascatto* or podlar, nay some of them had large stores, and send goods ou mule packs to the far interior, for at present this is the *ultimo thule* of this branch of the Mogyana. It is to be feared however that the opening of this branch as far as Mococa—noar the boundary of Minas—Sao Jose will got a check in its advancing career as far as tho last mentioned branch of trade is concerned.

The day was not lost, for as our mode of travelling was to be on mule-back, and as we were to use our own saddles, some additions had to be made to our accoutrements, in the shape of extra cruppers, girths, saddle-cloths, and, above all, a breast belt for the saddle must not be forgotten, for the roads we had to go over were described by Ananias as steep and stony in some places, and having mud-holes in others that would try the best *graith* and the pluck of the best mules to get through them. We had guns and a fair supply of ammunition, but the country was described as so full of game; some extra shot suitable for what we were likely to meet had to be procured. Cartridge cases we had enough of, and knowing from past experience the wretched powder procurable in the interior I had brought from Rio a fair stock of Curtis & Harvey's powder, note this as the powder to be bought here has more smoke thau penetration small shot for *snipe* and *codorno* (a small partridge) we bought 800 reis—(1s 8d) per kilo: aud the small bullets, of which you put three in your gun, if you meet an *Ounca*, (a small tiger) we got for 600 rois (1s 4d) per kilo. All our luggage had to be arranged to go conveniently ou the pack-mules, and many details, which many of your readers as old travellers, well understand had to be attended to.

The evening was agreeably spent, for with dusk came an advent of some three or four "Comets." In country hotols they generally make their appearance for the first time about dinner time; they are observable for perhaps a single day and two nights, and they continue their eccentric orbits, some having Sao Paulo as their centre, and some Rio de Jauoiro, after short visits, to these little worlds in the iuterior. They disappear and return some months after. I do not know if your commercial travellers would feel honoured by such a name being applied to them, but those of that class here are proud of it. These gentlemen scour the country with samples carried on pack-mules, and take

orders from the traders in the towns, for the houses they represent in Rio de Janeiro, Sao Paulo, or Santos. They are intelligent, energetic fellows, sociable, and jolly in the evenings, and to the traveller visiting these parts for the first time, they are living *encyclopædias* from which a great many notes of a very useful character, regarding the country one has to pass through, can be taken.

O Ananias! your name since my early infancy is connected with one who did not object to suppress the truth, and now that five o'clock has struck and daylight is breaking in sparkling golden lines away behind these high hills, there is no appearance of the mules which you said would be waiting before we could get out of bed. We were so anxious to catch the cool of the morning that night shirt, pijamas and slippers were put in the saddle-bags the night before in case the packing of these should cause delay.

I could hear no champing of bits, no snorting of animals. I opened the front door opening to the street, then the back door leading to the yard—all is vacancy and silence, except for that sonorous but inharmonious music of sleep given off from so many organs all over the house. Nor did Ananias himself turn out until six o'clock, and I believe that if he had not to get up to receive payment of accounts from "Comets" and others who had to leave by a train about 7·30 a.m. we might not have seen him then. He coolly answered if the mules did not come soon they must have broken out of the "Curral." (The Ceylon word Kraal comes from this). 8 a.m. no mules—we take breakfast—and by nine they appeared. I do not wish to libel Ananias, for different from his namesake of sacred history he had not a wife to aid him in his sacred councils, but certainly, he gained about four shillings on each of us, by our being so long in starting.

We are at an altitude of about 2,200 feet above the sea, and the air is cool up till nearly mid-day. Our ride was over rather steep roads for three kilometres. At the back of a range of hills, covered with campo grass and chena, we came to the river Rio Pardo—about 10 a.m. This would be 3 miles from Sao José.

The Rio Pardo (Brown River) has a characteristic name, for rising in a range of high mountains—a continuation of the Serra Negra, which I have mentioned before, as dividing the undulating plateaus of Sao Paulo from the rough mountainous campos of Minas Geráes, and although running here slowly, shows by its brown water that it is fed by many a mountain stream, and has already received the drainage of many square leagues of land. Here its width is about 100 yards.

There is a ferry boat here, but a more rickety affair could not be conceived. The construction is of two trees dug out placed parallel, about three feet apart, and a few loose boards crosswise on the top. We were not very confident that the other side would be reached without a ducking. I made sure our mules would object to this mode of crossing, but no; the old negro who acted as ferryman got a hold of the reins and the animal rode, with very little hesitation, jumped aboard, but we could not wish another four-legged passenger, for the loose boards were all curled with the sun and many were broken, and out of place, besides the canoes seemed to get their ballast increased by a considerable addition of water, so we shoved off. To lessen the risk of foundering I had to give the boatman a hand in the rowing of our frail craft and living cargo to the other side. The landing in the mud at the other side was a more serious matter. The only accident however was the soiling of my riding boots and my clothes getting ornamented by some cakes of mud having been thrown up through the floundering of the mule in reaching terra firma. One by one we had to cross, and this delayed us very much, particularly since some of the other animals were either obstinate or not well educated in crossing rivers in such a fragile craft.

After crossing the Rio Pardo we had to ascend a steep hill on patana land. Then we went for five or six miles through some magnificent forest trees with trunks of large diameter and of collossal height, creeping shrubs with flowers of varied hues, while the singing birds of all sizes and colours had not yet ceased their morning song, and mingling amongst the music of the forest the home of insect tropical life, and the shrill drones of the many crickets and cigaros (a large tree cricket) gave to these parts the enchanting charms which a traveller in the tropics loves to dwell amongst, but can with difficulty describe several hills of forest similar to this alternating with ridges, and plains of campo were crossed. The soil is of the rich Terra Rocha, the finest soil for coffee as yet known. All these forest lands are however in the hands of wealthy owners, and will by-and-by be laid low for planting the favorite coffee bush. There are still many square miles of these forest in these regions. These are not likely to change hands but they will be turned to profitable account by the present proprietors as soon as the labour difficulty is successfully solved.

Game in the bird line was plentiful, both in the forest and on the wide expanses of campos through which we passed that day, but we had started late in the day and had 36 miles to ride before dark, so we could not wait for shooting.

All along this road there were neither resthouses nor bazaars (or vendas as they call them here). We stopped at a native hut by the side of our road and got an old negro woman to make us some coffee, while we discussed some fowls' wings and legs, which Ananias had supplied us with as a bite on the road. The day was cool and, barring the steep sides of hills, the stony fords, and the mud-holes, the journey was agreeable. We reached the end of our day's ride at a town called Guaxupe about an hour before dark. Our route all day had been in a north-westerly direction, the province of Sao Paulo being left behind us at S. José.

Guaxupe is an Indian name, and is given to this small town of some 1,500 inhabitants and which boasts of only one church, while many of the same size in Brazil have three or four. There is an hotel called the "Reteiro dos Vigantes" (the Travellers' Retreat). The culinary and eating departments are on one side of the street and the sleeping and travellers' retreating apartments, on the other. Our bath was taken in a large galvanized basin which we considered quite a luxury. A bullock had been that day killed, and we had plenty of rational food for this our first experience of Minas hotels. The hotel happened to be full and my friend and self had to sleep on the floor of the "salle," or sitting-room. Some pleasant days were spent here and I did not get promoted to sleep on a bed all the eight days I stayed at the Retreat.

Coffee planting is the principal agriculture here. The planters have not suffered from the emancipation to the same extent as in many districts, as the principal labour has always been the *camarada* or half-caste between the white and the Indian. Although not slaves they are accustomed to work in gangs.

The landowners here hold only small pieces; the farmer in many cases works with his labourers in the field, and feeds along with them—thus getting the maximum amount of labour out of them. Coffee is dried in the cherry and sent to some central mill, or to some neighbouring proprietor who may have erected coffee cleaning machinery, to be prepared for the market. Many of these seemingly poor farmers are making money owing to the high price of coffee, and the railway coming so near to them. The colonist system of labour is almost unknown here, but will gradually follow after its success in the province of Sao Paulo. As I have some duties in the interim which will occupy some five months I will not be able to return to the Coffee Districts of S. Paulo for that time, when I intend to give a short account of the greatest of Brazil's coffee centres—that of Rebeirao Preto, and these notes will then come to a close.

You will have seen by the European papers that our elections have passed quietly over, the candidates of the Provisional Government having gained all along the line. The Deputies and Senators are now wending their way to the capital, to take their places in Congress which is to meet in a few days.

The Emperor's palace, situated on a nice picturesque piece of ground overlooking the beautiful bay of Rio de Janeiro, is being fitted up for the deliberations of that important body. After some days spent in formal business their duties will be to approve the Constitution, and to elect a President and Vice-President. It is said in some quarters, that, this business done, the two houses will be prorogued until May, by which time each province will have received its constitution and will have thus consolidated the Government by a Republic composed of Federal States. It is expected that after the election of a President all the European powers, which have not as yet done so, will recognise the Estados Unidos do Brazil. The principal acts of the Provisional Government have been generally approved by the nation, but many differences of opinion have been expressed regarding its financial policy. Exchange however is now rising and the value of the milreis is two shillings. All duties have now to be paid in British sovereigns at par or 27 per milreis.

A. SCOTT BLACKLAW.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Dec. 4th.

ANNATTO.—There have been larger arrivals of seed from Ceylon this week, two vessels bringing 278 packages.

CINCHONA.—The bark supply offered at Tuesday's auctions was a very moderate one, consisting of :—

		Packages		Packages	
Ceylon bark	...	1,064	of which	971	were sold
East Indian bark	...	684	do	623	do
Java Bark	...	75	do	75	do
South American bark		234	do	171	do
West Coast African		221	do	156	do
Total	...	2,278	do	1,996	do

The assortment was not remarkable in any way, except for the unusually large consignment of bark from the African West Coast included in it. There was a small quantity of good Ledgeriana bark from the Wentworth plantations in India, and also a few lots of fine renewed Succirubra, but most of the bark was of ordinary or medium quality. Competition was brisk, and the improved tone of the market enabled holders to realise a slight advance on the previous auctions, the unit for good barks being 1⅝d per lb., and the average fully 1½d per lb.

JAVA CINCHONA.—Original: Succirubra stem quills, bold and long, but damaged, 6d to 6½d ; dusty stem chips 3½d ; ditto root 3d to 3½d per lb

SOUTH AMERICAN CINCHONA.—Of 230 packages of cultivated Bolivian Calisaya, 171 pkgs. sold at full prices. Quilly chips, 4d to 4½d ; medium to long fairly bright stem quill 5½d to 7½d per lb. Four cases (416 lb.) red quill, thin, damaged and colourless, imported via Hamburg, were withdrawn.

WEST COAST AFRICAN CINCHONA.—No less than 221 bales (28,269 lb.) of bark grown in the Island of Sao Thomé were offered. The bark was imported in two consignments, via Lisbon, and 156 bales of it (19,169 lb.) sold at comparatively good prices to German quinine makers and French druggists. Calisaya and succirubra hybrid medium quill, fairly bright, but damaged 4½d to 5d ; chips and shavings 3½d to 4½d per lb. The greater part of this parcel was slightly damaged. The exports of cinchona from Java during the three months from July 1st to September 30th, have been as follows :—

	1890 lb	1889 lb	1888 lb	1887 lb
Govt. plantations, Amst.	64,208	18,264	148,749	170,295
Private ,,	1,595,818	987,641	986,363	864,391
Total	1,660,026	1,170,283	1,065,112	1,034,686

COCOA BUTTER.—At the monthly auctions, which took place here on December 2nd, 300 2-cwt cases of Cadbury's brand sold at prices ranging from 13¼d down to 12⅝d, closing at about 13d, the result being a decline of about 1½d per lb as compared with the November auctions. On the same day 70,000 kilos of Van Houten's cocoa butter (A) were sold by auctions in Amsterdam. They realised from 68¼ to 70⅓ cents per ½ kilo, equal to about 12¼d to 12½d per lb., or rather less than the prices paid in London.

OILS (ESSENTIAL).—Citronella is worth 13-16d per oz. on the spot for fair native quality, and for arrival 11½d per lb. c, i. f. is asked for tins. Lemongrass oil on the spot is 1¾d per oz., and for arrivals the quotation is 1½d per oz. c.i.o terms.

OILS (VARIOUS).—Coconut Oil : Ceylon steady, at 31s 6d for fine quality on the spot, while for near at hand 28s d, c. i. f. terms, is quoted. Cochin has advanced, and is now worth 33s 6d to 34 6d on the spot according to quality, while for distant delivery 32s 6d, c. i. f. terms, is asked.

QUININE.—There has been a somewhat better feeling in the market this week, although the sales reported only amount to about 40,000 oz.—second-hand German bulk at 11¾d to 12d per oz., and some Brunswick, from the makers', at 12d per oz. for April-May delivery. Ther would be further buyers at 12d per oz. for forward delivery now, and also 11¾d per oz. spot, but there is nothing to be had at those figures. The B. & S agents have refused all offers below 13d per oz. for January-February, and hold firmly at that quotattion.

A PAMPERED RAILWAY COMPANY.

Mr. Geo. W. Christison, a Darjeeling tea-planter and Manager of the Lebong Tea Company, Limited has begun a strenuous agitation against an importan public grievance, in regard to which some correspondence has appeared in the *Englishman* lately. Mr Christison, for the first time, tries to bring an organised protest, and Government pressure, if possible, against what has been generally known as the excessive cupidity of the Darjeeling-Himalayan Railway Company, fostered as it is by the indulgence of an over-lavish Government. Although subsidised from the public funds to an extent that no railway in the country has been, the public interest is the last thing it seems to look to, payment of a large dividend to shareholders and fat salaries to officers appearing to be its sole concern. The rolling-stock it maintains is far from adequate to the demands of the traffic along the line, so that in busy and rainy seasons goods accumulate at the stations to the great loss of importers and exporters, notwithstanding that bullock carts still carry a good deal of the traffic. The consequence is that, in order to secure a large dividend from a comparatively small traffic, the rates have been kept up from the beginning at exorbitant figures, though it has been amply proved that, with some present sacrifice by laying out money on rolling-stock and improving arrangements, the rates could be considerably reduced without any permanent loss to the income of the Railway.

Passenger fares by the Darjeeling-Himalayan Railway for first and second classes are four times as high as those on the Eastern Bengal State Railway, and third class fares more than six times as high as on the lowest class of the Eastern Bengal State Railway. Parcel rates are higher for 5 miles of the Darjeeling-Himalayan Railway than for 328 miles of the Eastern Bengal State Railway. With regard to goods generally the highness of the scale will be understood when it is known that the price of coal together with freight from Naihati to Silligorie (305 mile) amounts to very much the same as the charge for freight alone over the 51 miles of Darjeeling-Himalayan Railway from Silligoorie to Darjeeling.

In response to strong representations for reduction of rates made by the Darjeeling Tea Planters' Association, of which Mr. Geo. W. Christison is a leading member, the Darjeeling-Himalayan Railway has offered a rebate of 5 per cent on coal and 7½ per cent on all other goods. But Mr. Christison regards this to be utterly inadequate to meet the necessities of the case, and he urges upon the Association to press for more, and if accepting the terms offered by the Darjeeling-Himalayan Railway not to bind itself to keep quiet for the next five years, as is stipulated for by the former. In one of his circular letters addressed to the members of the Association through its Secretary, Major Harrison, Mr. Christison writes :—

"It is very evident from the paltry reduction upon coal (the most important of all) where the difficulty lies. If a proper reduction were made, the increase of traffic would be such that the Railway could not carry it. It therefore is the duty of the Association to go to the root of the evil, and induce the Railway to increase its rolling-stock and otherwise improve its arrangements in regard to stations, godowns, cranes, &c., and, if necessary, even

petition Government for this. The line is clearly being worked for the immediate profit of the shareholders, and not for the good of the public. Government has granted the Railway vast concessions in the public interest and would certainly insist upon it making proper arrangements for the public traffic if a strong representation were made in the proper quarter. It is calculated by the best authority that ten lakhs are needed to provide rolling-stock, and otherwise put the line into proper order. The raising of this extra capital might affect the dividends for a time, but the shareholders would ultimately be gainers as well as the public."

The "concessions" referred to in the above paragraph are six very substantial ones, besides others of a minor nature. These are (1):—Free use of the Cart Road between Silligoorie and Darjeeling, said to be one of the best of its kind in the world, for the laying of the lines of the Darjeeling-Himalayan Railway. (2) In regard to the maintenance of this Cart Road the Railway Company is in the position of contractors to the Government, being paid for on a most liberal scale of rates, with 15 per cent. added for tools, plant, and supervision, the landslips being looked after by the Government for the first five years, and still very largely, if not entirely. (3) A most liberal subsidy for the carriage of mails. (4) Free use of Silligoorie Station and appliances till the line makes a clear dividend of 7½ per cent. (5) All materials for the Darjeeling-Himalayan Railway carried at a reduction of 40 per cent. on the minimum rates over the Northern Bengal State Railway. (6) On completion of contract, the Government to take over the line at the market price of shares plus 25 per cent. premium on such market price. The grant of the use of the Cart Road saved the Darjeeling-Himalayan Railway Company 50 lakhs, and it has recently obtained exemption from payment of road and public work cesses.

In view of these concessions from the public funds, and presumably in the public interest, Mr. Christison rightly insists, and hopes that a fair reduction in the rates for goods, particularly for coal, may be obtained, and better arrangements made for the carriage of the traffic. Other railways have borne the whole cost of their construction, and without any such concessions manage to offer rates immeasurably lower, paying themselves fairly and furnishing every necessary convenience to the public. Over and above the high charges, not the least of the inconveniences by the Darjeeling-Himalayan Railway, is the discreditable delay that takes place in the transit of goods owing to the insufficiency of rolling-stock, so that godowns are often reported blocked, and goods have to lie exposed in the rains; while a good deal of traffic is carried yet by bullock carts and other modes of conveyance that ought, with fair rates and better arrangements, to go by rail. Mr. Christison suggests that the number of carriages and waggons of the Railway should be increased together with a reduction of rates, and a fourth class should be provided for the poorer classes 50 per cent cheaper than its present third class particularly as so many coolies have to be transported over it. He further declares that instead of the 5 per cent reduction on coal offered by the Darjeeling-Himalayan Railway no less than 33⅓ per cent would be fair, and even 50 per cent would not be unreasonable or out of proportion to the rates for coal charged by other lines, while in place of the 7½ per cent general reduction offered under other heads, 10, 18, 20, 25, 40 and even 56 per cent on different goods "would be fair, and nothing more." These contentions are supported by an array of statistics carefully collected and arranged so that there can be no two opinions as to the conclusion they lead to. Mr. Christison points out that the reduction now offered by the Darjeeling-Himalayan Railway Company, so as to draw the Darjeeling planters into an agreement to keep quiet and send all their goods by the Railway for the next five years, is a repetition of Mr. Prestage's old bribe (with an addition of 2½ per cent) to get the Darjeeling Carrying Company closed and thus have a monopoly of the traffic over the Cart Road. "The Agreement," remarks Mr. Christison, "is unworthy of any railway. Certainly, if the Association, as well as the individual members accepting, are to be bound hard and fast for five years, and other routes to be closed, the rebate is not worth the sacrifice." Mr. Christison would rather have the cart traffic revived on its old scale if the Darjeeling-Himalayan Railway does not come to terms. The common rates by bullock carts from Silligoorie to Darjeeling vary from 6½ annas to 8 annas per maund—10 annas and upwards in the rains being rather an unusual fare, and 9 annas per maund being rarely paid by those who carry regularly and understand the business. Taking 8 annas as the average rate, it is little over half the charge by the Darjeeling-Himalayan Railway if down traffic (which includes large quantities of tea) be allowed for.

Mr. Christison has taken up a very good cause, and he deserves the support of all sections of the public. He is fighting in the interest not alone of the Darjeeling tea planters, but of the public generally to whom the Darjeeling trade and Darjeeling as a place of business as well as sanitarium, are daily growing to be of greater importance. HOPE.

—*Indian Planters' Gazette.*

TEA CULTIVATION IN JAVA.

The Italian *Bolletino Consolare* gives the following account of the present condition of the tea industry in Java:—

The cultivation of tea in the Dutch Indies is practically confined to the island of Java. It is mainly carried on in the province of Preanger, in the western part of the island, where it is rather a part of horticulture than of agriculture. The industry is in the hands of experienced planters, who are sparing no pains to increase the prominence and quality of the Java teas. Notwithstanding their care, however, as early as in 1887, they could not congratulate themselves on the price of their article. In 1888 it continued to fall, and the planters were forced to expend their utmost energy on saving their plantations from ruin. This was the case not merely with recent enterprises, but with old plantations, that had flourished for many years. The weight of this depression fell, of course, on the native population, which until then had obtained a comfortable livelihood by the cultivation of tea. The quantity produced on the Java tea plantations scarcely fluctuated in the three years, 1886, 1887, and 1888; it remained at about 325,000 kilos. per annum.

In addition to this steady decline in price, the Java tea plantations have been ravaged by an insect (*Helopoletis antonia*), called Boedock Hamand in Malay, and Theluis (tea-louse) in Dutch, which each year destroys in value hundreds of thousands of florins. It is needless to add that the planters have offered the most liberal rewards to any one who will devise an infallible mode of freeing them from this devastating foe, but hitherto with as little success as in the case of the diseases of the coffee-palm and the sugar-cane.

At the same time there is noticeable a distinct improvement in the quality of the Java teas. Until lately, on account of the quantity of tannin which it contains, the Java tea has only been bought in Europe when mixed with China tea; but the improvement of the quality has now rendered that needless, while the cultivation of Assam plants will presently enable the planters to compete with Ceylon and British India. Nor must it be forgotten that during the last two years great improvements have been introduced in the preparation of the tea. The most recent inventions have been applied, and nothing which is happening in Asia, which can be of any utility to the Java tea planters, is permitted to escape their attention. For many years past it has been proved that the climate and the soil of Java are perfectly adapted to the cultivation of tea, and are powerfully aided by the regular rainfall in that mountainous country, which produces an abundant growth of leaves.—*L. and C. Express*, Nov. 28th.

POTATOES AS PEN WIPERS.

One of the chief woes of the ready writer, be he clerk or what not, consists in the fact that he no sooner gets a pen into good working order than it, like the "dear gazelle," comes to an untimely end from the corrosion caused by the ink. Life is not long enough to use and mend quills, nor to apply with delicate firmness the pen wiper to a steel one. But some genius has now hit on a solution of the difficulty which has the merit of the most extreme simplicity. In many offices, we are informed, a potato is used instead of a pen wiper. The juicy tuber holds the pen steady, removes at once all ink from the nib, and prevents, or at least very greatly delays, the process of corrosion, and spares many a well-loved pen to a ripe old age.—*Pall Mall Gazette.*

CURIOSITIES OF MISNOMER.

Black lead is not lead at all, but a compound of carbon and a small quantity of iron. Brazilian grass is not grass, and never saw Brazil—it is nothing but strips of palm leaf. Burgundy pitch is not pitch, and does not come from Burgundy; the greater part of it is resin and palm-oil. Catgut is made from the entrails of sheep. Cuttle-bone is not bone, but a kind of chalk once enclosed in the fossil remains of extinct specimens of cuttlefish. German silver was not invented in Germany, and does not contain a particle of silver. Cleopatra's Needle (the obelisk now in Central Park) was not erected by the Egyptian Queen who "lost Mark Antony the world," nor in her honor: nor has that other Egyptian monument, known as Pompey's Pillar, any historical connection with Pompey in any way—being erected by or in honor of a very different Roman, Diocletian, and it ought to be known by his name.

Sealing-wax contains no wax at all, but is composed of Venice turpentine, shellac and cinnabar (or red lead). Turkish baths did not orginate in Turkey, and are not baths, properly so-called, but rather heated chambers. Whalebone is not bone, although it does come from the leviathan for which Nantucket, New Bedford and Sag Harbor used to make those three-year voyages; moreover, it is said not to possess a single property of bone.

Truly, it seems that the nomenclature of common things is not unlike that celebrated definition which the French Academy of Sciences once made of a crab—"a small red fish which swims back ward"—and of which Cuvier remaked that "the crab was not a fish, it was not red, and it did not swim backward—but that otherwise the definition was admirable!"—*Providence Journal.*

SISSAL FIBRE.

Mr. Benson, Assistant Director of Agriculture, Madras, in continuation of previous correspondence, writing on the 8th May said:—"In reply to your letter dated 3rd instant, for which I thank you, I have the honour to inform you that I have communicated the contents thereof to my correspondent, and I will let you know the results. In the meantime you may be interested in reading the following extract from a letter received from the Director, Botanical Department, Northern India, regarding the plant, from which it would appear that there seems to be some doubt as to the Sisal hemp being obtained from a plant not already introduced."

"*Extract.*—Sisal hemp is said to be yielded by Agave Sisalana. This is probably only a variety of the American plant called *Agave vivipara*, which is abundantly cultivated as a hedge plant in various parts of India, and is largely used for fibre in Upper India. Any number of bulbs or small plants could be sent to you from Saharunpore, but as the carriage would be expensive, it would be better to arrange for a supply nearer at hand. It is mentioned on page 118 of Dr. Bidie's catalogue of the Raw Products of Southern India."

Mr. D. Morris, of Kew, writing in April in reply to inquiries, said:—"We have very fully dealt with Sissal Hemp in the *Kew Bulletin*, and last month we gave some additional information in treating of Bombay Aloe fibre. This letter was not before you when you wrote. The greatest difficulty would be experienced in obtaining plants of Sissal hemp from Yucatan or the Bahamas. We have, however, established the fact, that the true Sissal hemp exists in the Turks Islands, dependencies of Jamaica, and also in Florida......As regards machines there are, no doubt, several in use in different parts of the world. For instance, in Mauritius they have a very simple and apparently satisfactory machine, which has been used for several years. This cleans the leaves of the Furcrœa gigantea. In Yucatan they have the Death and Ellwood Machines, I believe, but they also use another machine somewhat similar to the Mauritius machines. A full account of this last will appear in the *Kew Bulletin* for May. When the subject is sufficiently advanced to import machines for cleaning Agave leaves on a large scale in India, I have little doubt that either the Mauritius or Yucatan machines will be found to afford adequate results, or failing these, there is a new machine brought out by the Death Fibre Machine Company which is said to be a great improvement on all former machines."

Since Mr. Morris' letter was received, the Kew Bulletin for May is to hand, with a description by M. de Chazal of the machines used in Mauritius for cleaning aloe fibre. The subject will receive careful attention, as there can be no doubt that in many parts of the country the species of Agave, common in India, could be made to yield handsome returns, as it will thrive on land unsuited for ordinary crops. One of the members of the Society's Committee remarks as follows about the fibre of this plant:—"Aloe fibre becomes more valuable when the price of Manilla hemp is high, and there is more fluctuation in Manilla hemp than any other fibre. It is not merely supply and demand but, being a centralized and comparatively small business, it is a favourite for speculation, and the price is forced up often 50 per cent., suddenly. It has so happened for the last two years. Just now the price is low. It is when the price of Manilla hemp rises so high from speculation, that other fibres, such as aloe, are more in demand."

No doubt with a large steady supply of the fibre existing in the country, special uses would be found for it. Messrs. Harton & Co. of Calcutta, produce a very lasting and neat matting, somewhat like coir, but finer, from this material, samples of which will be sent to Kew to show what is already done in the country with hand cleaned fibre.

In connection with the subject of aloe fibre, read the following letter to the Deputy Secretary from Messrs. Smith aud Neale, Bridgeport, Connecticut:—

"I have seen an article written by you copied in the "Scientific American" relating to Pine-apple fibre. I am thoroughly posted on fibre machinery, and could get you up a simple and good machine for getting the fibre out of the leaf in an expeditious manner; so it would be in good shape to be fed into drawing frames and cards. I can make the machine small and light running, so it can be worked by hand or foot power, horse power, or steam power. It would be necessary for me to know the extreme length of the leaf, and if I had a small quantity of the leaf, I could run it through the machine and send it on to you. I understand it ought to go through green so as to save the fibre. I think I could build a light running foot power machine that would turn out 250 lb. per day, hackles in good shape for the Drawing Frame." In acknowledging Mr. Neal's letter, he was informed that though the Society was not prepared to buy the machine, that should he send one for trial, it would be carefully tested, and a full report sent to him.

Should the machine prove a success, he could be put into communication with people in India who would he willing to negociate with him for working it commercially.—*Agricultural and Horticultural Society of India.*

HANDBOOK OF AGRICULTURAL AND COMMERCIAL CONCERNS IN NETHERLANDS INDIA.—From Mr. J. H. de Bussy of Amsterdam we have received the third annual issue (for 1890) of the "Handboek voor Cultuur-en Handels-Ondernemingen in Nederlandsch-Indië." This is a most useful work containing information regarding the various estates, firms, &c., in the Dutch East and West Indies arranged in alphabetical order and with indexes of names. The Government regulations for the cultivation of land and the cooly ordinances are also given. The whole, however, is in Dutch which to most Ceylon planters is "double Dutch."

THE CALCUTTA INCINERATOR.—Mr. Harrington writes as follows:—The incinerator is to be re-lighted on 6th December. The alterations that have been effected are—(1) The chimney has been heightened from 130 to 200 feet, (2) A powerful smoke crematorium has been constructed, (3) Self-acting hot air blasts have been introduced, which pass through the hottest part of the refuse furnaces on to the smoke crematorium; and the smoke crematorium chamber is so intersected with reverberating cross walls of heat absorbing material that a very high temperature will be maintained therein. After these alterations and when the incinerator has become fairly heated, Mr. Harrington anticipates that there will be but little smoke escaping from the chimney.—*Indian Engineer*, Dec. 6th.

HOW HE PLANTED MY POTATOES.—The piece of ground would be about 150 square yards in area, so rather less than 5 rods, and was sheltered and warm, and had been long under cultivation. The last digging it had got was when the winter frosts had departed, some time late in March. Johann was furnished with the ordinary Croatian hoe, fitted on a handle of about 2 feet 6 inches long, and with the heart-shaped blade, and bending low, was scooping out the shallow basins destined to receive the sets at the stretch of his long legs apart—that is, about 3 feet 6 inches. I could see that the quantity of "seed" required would be much less than by the English mode of planting; but I did not expostulate much with him about it, although I imagined that my crop would be a light one. The sets were duly planted, and the ground made level with the aforesaid hoe. Under the hot sun of Southern Moravia the shoots soon came above ground, and here another surprise awaited me; for when their earthing-up became necessary, my Croat, instead of drawing up the earth in long ridges, in English fashion, made a little rounded hillock around each stem, or bunch of stems, and as the tubers grew, and the hillock distended under the pressure of growth below, more soil was drawn to it; but at the finish each set had its own hillock of mould, independent of its neighbours. This form of earthing-up allowed the haulm, which was strong, to lay on the ground, between the hills, and not on them, so that had disease attacked the Potatos, the spores of the Peronospora would have mainly fallen on ground which contained no tubers; moreover, the sun's rays shone on every part of the haulm—a matter of great importance in plant growth, more especially if the growth be of short duration. The crop of Potatos was enormous, and measured from three-quarters to 1 peck at a root, which, at that rate, was 150 pecks for the 5 rods of ground planted. I felt that the foreigner, with his inborn common sense, had taught me a useful lesson; but it was only one among many that had still to be mastered. *Recollections of an Englishman Abroad*—*Gardeners' Chronicle.*

TANK SHIPS IN THE NITRATE TRADE.—A new departure in the construction of ships designed for the nitrate trade was heralded by the launching of the largest sailing ship in the world the other day, says the London *City Leader.* This ship is remarkable, not only for its size, but for the arrangements made to preserve its cargo. Nitrate of soda has a strong attraction for water, absorbing so much of it from the air as to be dissolved by it in large quantities when in bulk. The custom is to discharge this nitrate liquor overboard, and so lose it, but on the new vessel special tanks are fitted in the hold, into which the liquor drains.—*Bradstreets.*

THE TECHNICAL EXPERTS who, under the direction of Sir Colin Scott Moncrieff, have been to Merv for the purpose of examining the state of the irrigation works carried out by the Russian Administration in Central Asia on the Czar's estate in that region, have returned to St. Petersburg, bringing very unfavourable reports of the condition of affairs. The Administration had proposed to effect the irrigation of about 250,000 acres of land, but from the Engineer's report it appears that there is no hope of irrigating more than about 32,000 acres at the outside.—*O. Mail.*

THE YIELD OF MARIAWATTE, 1,347 LBS. AN ACRE!—This is certainly a splendid record, whether we take the old 100 acre plot or the whole of the large acreage under tea. From our old files we find that the following has been the yield of this far famed field of tea for the past seven years:—

1884	...	1,092 lb.	made tea	per acre.
1885	...	1,178	do.	do.
1886	...	1,059	do.	do.
1887	...	1,126	do.	do.
1888	...	1,033	do.	do.
1889	...	1,105	do.	do.
1890	...	1,347	do.	do.
Average of 7 years		1,133	do.	do.

POTATO DISEASE.—Time was when it seemed as if we had no means of arresting or mitigating this plague. But now we know that by proper modes of planting, adequate moulding, the selection of suitable kinds, or the use of sulphate of copper solutions, we have the means of controlling the disease to a large extent. But although each of these methods has been made known widely, very few have availed themselves of them. They are specially suited for the cottagar, the allotment gardener, and the cultivator on a small scale, and it is disappointing to see no effort at all made to mitigate the pest. What is still more disheartening is to witness the utter apathy with which even intelligent cultivators allow the disease to be propagated wholesale by their carelessness and their almost incredible negligence, which ensure the best possible means of facilitating the growth and dispersion of the fungus.—*Gardeners' Chronicle.*

CINCHONA PLANTING IN JAVA.—An extraordinary general meeting of the shareholders in the West Java Cinchona Company was held in Amsterdam last week, when the managing director, Mr. M. J. Boissevain, submitted certain proposals which seem to indicate that the undertaking is hardly so prosperous as its proprietors could desire. It was proposed that of the four plantations belonging to the company—viz. Tjiseureuh, Bajabang, Pangairan and Tjidoerian—the two former shall be entirely uprooted. The proceeds of the bark thus obtained are to be used to reduce the share capital of the company. It is estimated that the capital will by this method be reduced by about 30 per cent., and it is hoped that the two remaining plantations will yield a sufficient profit to admit the payment of a fair dividend on the reduced capital. The proposal, which was the result of an investigation of the company's plantations by an expert, was unanimously agreed to.—*Chemist and Druggist*, Dec. 19.

NOTES ON PRODUCE AND FINANCE.

THE SICK MAN OF CHINA.—The outlook for Chinese tea-growers is gloomy in the extreme. If India and Ceylon supply 75 per cent of the tea consumed, and this is the estimate, tea-growing in China is a bad business. Since Ceylon planters turned their attention to tea new life has been imported into the industry, so far as British enterprise is concerned. There has been no hiding of light under a tea chest. The advertisement business in various forms has been well worked, and so far from injuring their fellow-planters in the Indian tea districts by their trumpet-tongued announcements, the Ceylon planters have helped to a well the consumption of Indian as well as Ceylon tea. China is the sufferer, and a very acute one.—*H. and C. Mail*, Dec. 12th.

STAPLE EXPORTS: TOTALS FOR 1889 AND 1890.

From the Customs Tables we take the returns up to the end of December. It will be observed that last month shewed a good deal of activity in the shipping of Tea, Cinchona, Cocoa and Coffee. The total exports for 1890, according to the Customs accounts (which differ from those of the Chamber of Commerce) show 44,869,015 lb. of tea, an increase of over 11 million lb. on 1889: 8,720,287 lb. cinchona bark, a decrease of 600,000 lb.; cocoa, 15,697 cwt., a decrease of 3,000 cwt.; while coffee of all kinds shows a slight increase:—

1889. Months		Coffee Plantation. cwt.	Coffee Native. cwt.	Coffee Liberian cwt.
January	...	10,941	1,868	19
February	...	12,283	1,861	72
March	...	4,567	799	65
April	...	1,313	1,582	97
May	...	1,215	852	70
June	...	4,139	867	113
July	...	7,533	25	54
August	...	11,608	181	90
September	...	2,917	131	85
October	...	2,415	121	8
November	...	5,666	268	13
December	...	12,610	142	21
		77,207	8,697	707
1890				
January	...	19,857	966	258
February	...	16,615	131	82
March	...	10,463	666	497
April	...	1,578	1,380	401
May	...	3,056	726	734
June	...	4,803	524	255
July	...	6,797	256	194
August	...	4,324	42	207
September	...	1,920	314	87
October	...	3,115	313	241
November	...	4,010	159	46
December	...	3,519	236	56
		80,057	5,713	3,058

1889. Months		Tea. lb.	Cocoa. cwt.	Cinchona. lb
January	...	2,663,041	3,915	1,076,700
Februar	...	2,089,615½	2,328	834,106
March	...	3,522,929	1,733	813,345
April	...	2,631,082¾	540	1,026,177
May	...	3,600,608	227	827,732
June	...	3,685,857	1,130	559,196
July	...	2,702,241½	1,210	365,758
August	...	2,729,904¼	1,553	1,035,454
September	...	1,604,147	412	659,977
October	...	3,030,324	45	675,818
November	...	2,615,628	274	735,903
December	...	2,847,234	5,262	715,562
		33,752,612	18,629	9,325,728
1890.				
January	...	3,293,325	3,905	520,311
February	...	3,156,583	2,111	741,815
March	...	3,407,883	1,937	796,090
April	...	4,122,827	1,338	699,921
May	...	4,791,586	906	874,650
June	...	4,996,447	633	617,942
July	...	5,256,538	1,077	658,982
August	...	3,400,975	697	978,762
September	...	2,944,883	83	640,847
October	...	3,143,204	260	989,377
November	...	3,351,560	1098	592,221
December	...	3,003,201	1652	579,369
		44,869,015	15,679	8,720,287

THE CEYLON EXPORT SEASON FOR 1890.

RATES OF PRODUCE AND FREIGHTS ON COFFEE TRADE.

	Middling Plantation Coffee per cwt.	Coconut Oil Per ton.	Per Unit of Sulphate of Quinine.	Cin. Twigs & Branch. per lb.	Cinnamon per lb.	Plumbago per ton.	Rice per bag.	Steamer Freights per ton to London.
1889	s.	R R	c. c.	c.	c. c.	R R	R c. R c.	s. d.
Dec.	102	200	7 to 11	—	34	210 to 250	8 30 to 8 75	— 40 to 45
1890								
Jan.	103	310	7 to 11	—	—	190 to 230	7 50 to 8 00	— 40 — —
Feb.	104	305·75 to 305	8 to 13	—	—	180 to 215	7 60 to 8 36	— 6 to 35
March	102	305	8 to 12	—	31	190 to 200	7 65 to 8 —	— 30 to 35
April	100	290	8 to 10	—	30	170 to 200	7 25 to 8 25	— 30 to 40
May	101	290	7 to 9½	—	30	190 to —	8 25 to 8 65	— 35 to 40
June	103	295 to 300	6 to 9½	—	34 to 34	145 to 168	8 00 to 8 65	— 26 — 35
July	102	310 to 312·50	6 to 8	—	34 to 36	170 to 215	8 60 to 8 70	323 6 — 35
Aug.	105	300 to 305	6 to 9	—	34	170 to 220	8 50 to 8 65	27 — to —
Sept.	105/6	322·50 to 330	9½	—	32	170 to 240	8 50 to 8 70	— 32 to 36
Oct.	105	305 to 307·50	6 to 8½	—	32 to 33	185 to 240	7 70 to 8 —	— 36 to 406
Nov.	104/6	320 to 330	6 to 8½	—	29	175 to 240	7 50 to 7 80	— 40 to 37/
Dec.	103	310	6 to 8½	—	30½ to 31	170 to 250	7 50 to 7 70	— 40

THE AMSTERDAM CINCHONA AUCTIONS.

(*Telegram from our Correspondent.*)

AMSTERDAM, Dec. 13th.

The manufacturing bark offered at today's auctions contained an aggregate of about 13½ tons sulphate of quinine, or 4·03 per cent on the average, divided as follows:—About 22 tons contain 1·2 per cent; about 64 tons contain 2·3 per cent; about 101 tons contain 3·4 per cent; about 62 tons contain 4·5 per cent; about 53 tons contain 5·6 per cent; about 20 tons contain 6·7 per cent; about 14 tons contain 7·8 per cent. The entire supply was disposed of at some decline, the unit value being: for low-grade barks, 7½ to 7¾ cents per ½ killo. (= 1¼d to 1⅜d per lb.); and for high-grade barks, 7¾ to 8 cents (= about 1⅜d per lb.). The following were the prices obtained: manufacturing barks in quill, broken quill, and chips, 7 to 63 cents (= 1¼d to 11⅜d per lb.); ditto root, 16 to 55 cents (= 3d to 10d per lb.). Druggists' barks, in quills, broken quills, and chips, 7 to 89 cents (= 1¼d to 1s 4d per lb.); ditto root bark from 9 to 37 cents (= 1⅝d to 6⅝d per lb.) The principal buyers in the order of their purchases were the Auerbach factory, the Brunswick works, and the Amsterdam quinine works.—*Chemist and Druggist.*

CEYLON TEA AVERAGES IN LONDON FOR 1890.

As the last public sale of Ceylon tea has been held this year, we give below the results of Reutor's and Messrs. Wilson, Smithett & Co.'s weekly telegrams during the past twelve months in tabular form, with similar figures for the previous year, for the sake of effective comparison. The first thing that strikes one on comparing the two sets of figures is the wonderful uniformity which has characterized the averages this year as compared with last year. In 1889, the aver-

ages ranged from 9d to 1s 2d a range of 5d a lb. This year the figures ranged from 9¾d to 1s 0¼d, a range of only 2½d. In other words there has been exactly 50 per cent less range this year than last. Indeed, when we examine the monthly averages. we find but little change at all. The lowest was 10¼d in March and April, and the highest 11¾d in September, October, and November. The figures for monthly averages are as follows:—

MONTHLY AVERAGES DURING 1890.

January	11½d	July	10¾d
February	11¾d	August	10½d
March	10¼d	September	11¾d
April	10¼d	October	11¾d
May	10½d	November	11¾d
June	10¾d	December	11d

These figures take in conjunction with those given below, ought to be of great interest to all our upcountry readers. The following are the quantities offered and sold, and the averages realized weekly in London during 1890:—

	1889.			1890.		
	Pkgs. Offd.	Pkgs. Sold.	Wilson Smithett's Average.	Pkgs. Offd.	Pkgs. Sold.	Wilson Smithett's Average.
January						
3	4500	3800	/10¾	2000	2000	/11¾
10	9500	7200	/10¼	14000	13000	/11½
17	9100	7000	—	11000	9000	/11½
24	9900	8000	/10½	8000	7000	/11½
31	9200	7700	/10¼	13000	11000	/11¼
February						
7	9500	7000	/10¼	8000	7000	/11
14	6100	5000	/10	10000	8000	/10¾
21	5600	5000	/10¾	9000	8000	/10¾
28	9500	7800	/10¾	11000	10000	/10½
March						
7	6900	6000	/10½	11000	9000	/9¾
14	9700	7300	/10½	7000	6000	/10¼
21	6800	6000	/10¼	11000	10000	/10¼
28	7300	5000	/10½	13000	11000	/10¾
April						
4	5900	4800	/10¼	4000	4000	/10½
11	11700	8800	/10			
18	5400	4500	/10¼	16000	11000	/10¼
25	2700	2300	/10¼	6000	5100	/10½
May						
2	15750	14000	/9¾	11000	9000	/10¼
9	16500	14500	/9½	15000	11000	/10½
16	11500	8700	/9½	9000	8000	/10½
23	12750	9500	/9¼	18000	17000	/10½
30	6500	5800	/9½	5000	5000	/10
June						
6	8600	7500	/9½	23000	22000	/10½
13	8900	8000	/9½	12000	12000	/10½
20	23500	14500	/9	15000	15000	/11¼
27	13750	12000	/9	16000	14000	/11
July						
4	9700	8500	—	8000	8000	/10¾
11	12500	11000	/10	14000	13000	/10¾
18	10000	8000	/10¾	9000	8000	/10¾
25	10000	10000	/10¼	14000	12000	/10½
August						
1	15000	14000	/11½	16000	14000	/10¼
8	2000	2000	/10¾	3000	3000	/10¼
15	9000	9000	—	20000	17000	/10½
22	11000	10000	1/0½	19000	17000	/10½
29				9800	9400	/10¾
September						
5	2000	1000	1/0½	20000	17000	/11
12	8000	7000	1/1¼	7000	7000	/11¼
19	8000	8000	1/1¼	10000	8000	1/
26	10000	9000	1/1¼	13000	12000	1/0¼
October						
3	9000	9000	1/1¾	15000	14000	1/
10	11000	11000	1/2	7000	7000	1/
17	8000	7000	1/2	9000	9000	—
24	4000	3000	—	9000	8000	/11¾
November						
1	7000	7000	1/1¾	8000	8000	1/
8	8000	6000	1/1¼	5000	4000	1/0¼
15	6000	3000	1/0½	6000	5000	1/
22	7000	5000	/11¾	11000	9000	/11¾
29	5000	4000	1/	10000	10000	/11
December						
6	12000	10000	/11¾	7000	7000	/11¼
13	7000	7000	/11¾	11000	12000	/11
20	9000	8000	/11¾	7000	6000	/11
Total	447250	380200		548800	488500	

—Local "Times."

LANKA PLANTATIONS CO., LD.

Below I would ask you to print the same journal's account of the meeting of the Lanka Plantations Company. In this case, as in that of the P. & O. Company above referred to, my previous letter anticipated nearly all that Sir R. P. Harding had to say to his shareholders. What fell from him, however, will not on that account be less pleasing to your readers:—

The tenth ordinary general meeting of the Lanka Plantations Company (Limited) was held on Wednesday at the offices, Old Jewry, Sir R. P. Harding presided, and in moving the adoption of the report stated that the advices which they received continued to lead them to hope and believe that the current year would certainly not be worse than the year of which they had the accounts before them. He thought that they might fairly consider that the Company had turned the corner, and every year which was added to the age of the tea trees should improve their position. They had 1,400 acres planted with tea, and probably they would soon have 1,500 acres; and if the average yield, when the trees got older, should be only 300lb. per acre, they would have 400,000lb, of made tea a year to dispose of. He had no doubt that this would give them very satisfactory dividends. Very great economy had been practised by their agents and superintendents. They were out of debt, and a debit balance of £1,458 had been discharged, They would be asked to approve the payment of the interim dividend on the preference shares, and to sanction the payment of a dividend on those shares for the second half of the year as well as the payment of a small dividend (3s a share) on the ordinary shares. He trusted that this would be the beginning of a much better state of things than they had experienced for some years. Sir Herbert B. Sandford seconded the motion. Dr. Bayford questioned the advisability of paying the small dividend suggested on the ordinary shares. For several years they had had deficits, and had accumulated a substantial debt, which he thought the credit balances shown this year should have been used in diminishing. He also advised the further planting of tea trees. The chairman, in reply, stated that the coffee which they now had was exceedingly good, and they were advised that the coffee prospects for 1890-1891 were extremely satisfactory. They had gone into tea planting as their resources permitted. They had reduced their indebtedness out of the profits and they had expended £1,900 this year in buildings and in fresh tea planting. They intended to decrease the suspense account, and not to add the capital account any further. The report was adopted and the dividends mentioned were afterwards approved.—London *Cor.*

"KEW BULLETIN."

The October number contains articles on an edible fungus from New Zealand, Hirneola polytricha, which is nearly allied to our common Jew's-ear fungus. It appears that this is in great demand in China, although the analysis, as given by Professor Church, seems to show that its nutritive qualities are feeble, and that unlike most fungi hitherto analysed, it is very deficient in albuminoids or flesh-forming matters. The preparation of Mexican or Istle fibre from Agave heteracantha, is described; the fibre being largely made use of for cheap scrubbing-brushes. The ravages of the moths known as the "Nonnen" (Liparis monacha). In the Bavarian forests, are detailed. It appears, that in Bavaria alone the loss to the forest revenue will amount for the year to something like £40,000. Okro fibre, from Hibiscus esculentus, and Coconut butter (not to be confounded with Cocoa-butter), receive attention. If this tasteless, fatty substance, can be prepared as suggested from the copra or dried Coconuts of commerce, the supply of material would be almost unlimited. Medical evidence goes to show that the fat in question meets all hygienic requirements, and is "far superior to animal fat and

butter, as well as any of their other substitutes."—— The November part contains an article on the Liberian Coffee, introduced to Kew in 1872, and distributed into commerce by Mr. Bull shortly afterwards. On July 22nd 1876, p. 101, Mr. Hiern favoured us with an article on the subject, to accompany a woodcut illustration taken partly from a plant in Mr. Bull's nursery, partly from wild specimens. It was hoped that the West African Coffee would prove more robust, and better able to withstand the attacks of fungus (Hemileia). At first, however, these expectations seemed likely to be disappointed but now we learn the tide of opinion in the planting world has set in favouring the Liberian Coffee, and various extracts in support of that opinion are given in the number before us. The African Cola-nut (Cola acuminata) is the subject of the next article, which comprises a brief summary of what is known on the natural history and properties of this valuable tree. The nuts contain caffein and theobromine, and their consumption is stated, on good authority, to enable the natives to undergo great exertions with relatively little fatigue. The bitter Cola, also alluded to in the *Bulletin*, is quite a different thing. A figure of the fruit was given in the *Journal of Botany* for 1875, by Dr. Masters, and the plant was subsequently described under the name Garcinia Kola by Heckel, who had had overlooked what had been previously published. The fruits in question have a bitter taste, and are probably destitute of the special virtues of the true Cola.—*Gardeners' Chronicle*, Nov. 22nd.

TEA ON THE NEILGHERRIS

After Coffee, Tea is to the European planter the most important industry on the Neilgherries. It was introduced in the year 1835, but made little progress until after 1860. At first it had to endure the same drawbacks that planting in Assam had, *viz.*, unskilled labour for cultivation and manufacture and inexperienced supervision; on the other hand, it had some advantages, such as choice of land, cheap labour and manure, and high prices for well-manufactured produce. As manufacture improved so did demand with the usual result over production for local consumption. The excess produced was sent to the London market with variable success. Either Neilgherrie Tea did not retain its flavour in England or planters did not receive justice in that quarter, and the latter is suggested by the fact that consumers, to whom expense was a secondary consideration, and who used the better classes of Neilgherrie Teas, preferred getting them from the estate direct to using what they termed "the high-priced flavourless Tea" that they obtained from grocers in England.

As Tea keeps better in large quantities, as sent in chests to the London market, than in small boxes, as sent to private purchasers, the Neilgherrie planter is at a loss to understand why the passing of his Teas through the usual business channels should result in their being classed low and realising little more than "*dust*" of other Teas. It must be admitted that Neilgherrie Tea is not strong like Assam, and that it is not at all useful for mixing with tasteless China Teas, but it is a good high class drinkable Tea by itself; especially in India, where it keeps with care for a considerable time. The Neilgherrie planter has something yet to learn, since it appears that his Tea does not reach the English market in good condition in lead lined chests, while those of other districts do so.

A few estates have obtained high prices, such as five and ten shillings per pound, notably Brooklands and Glendale, but these prices were for fancy Teas, and did not represent the ordinary manufacture for commercial purposes. Lately Kodanad obtained high prices for a large consignment; and if this continues, it will be a new departure on the Neilgheries, and help to solve the most difficult problem the Neilgherrie planter has to deal with, and prove conclusively to the most sceptical that climate is not the drawback to the district's Teas realizing good paying prices in the London market.

When tea planting was rushed lands were planted up that should not have been. The plant being hardy grows almost anywhere, and is not easy to eradicate, the small pieces of root left after a tree is dug out often start into new trees even in poor soil. Notwithstanding its hardiness and good growth as a tree, it does not grow so fast as in warmer climates with more rainfall; so that the production is not equal to that of Assam or the favourable Ceylon districts, and it would no doubt have been abandoned ere this only that its fine flavour obtained for it a large sale in India; this, together with cheap labour and a good climate, has been in its favour, and it is probable that the demand for it in England would increase considerably if it could be supplied to consumers in as good condition as it is to the consumers in India. It may be that the passage of Neilgherrie tea through the Customs Department, when it is turned out to be weighed and bulked, and handled in a very different way to what it is in the factory, is too much for its delicate flavour, but which the stronger Assams, Ceylons, and Travancores can probably stand. This seems to be the point where combination among planters may turn a poorly paying industry into a highly remunerative one.

The Tea produced in Southern India is not enough to appreciably affect the general prices in England. The imports of China Tea into England have fallen considerably, but have been amply replaced by increased supplies from India and Ceylon, in both of which countries there is land yet available, and more than enough to produce any demand that may be made from England. The annual increase in supply is quite equal to the increase in consumption as well as to the deficiency in supply from China: so that the prospects of a general rise in prices are not promising for the industry. Great efforts are being made to introduce Indian and Ceylon Teas into America and Russia, but satisfactory efforts are not being made to increase consumption in India. Consumption is increasing amongst the natives slowly but surely, and if it amounted to half a pound per head at the present rate of production, not a pound of tea would be available for England, where consumption is about $5\frac{1}{2}$ lb. per head of population. It will require a very small consumption per head in India to absorb all the increase that takes place annually. A trial is at present being made in Bengal. Perhaps a scheme something like the following might be more successful. Every estate in India to supply to a syndicate at least one per cent. of its produce (will aggregate about 1,000,000lb.) at cost price, or a little under it, say, an average tea for As. 5 per lb. delivered in the consuming district; the syndicate to add on 20 per cent. to cover expenses and profit, and to pay for the Tea supplied at the end of the year. For this consideration the syndicate to undertake to distribute the teas over the whole country, but in such manner as will not interfere with present important tea dealers, and in, or convenient to every hospital at the prices fixed, say, As. 3 per half lb. packet and As. 1-6 per quarter lb. packet. The teas to be supplied in such packets and properly labelled by the estates with full directions in the vernaculars for preparing the beverage.

No estate can lose much by such a scheme, while it may result in a very large increase in consumption of tea and a reduced consumption of alcohol. It should not be impossible to induce the women of India to indulge in tea who have no national beverage.—*Indian Planters' Gazette.*

SALE OF CEYLON TOBACCO IN LONDON.—Messrs. Grant, Chambers & Co. sold by auction on 11th Dec. 1890, 148 bales Ceylon leaf tobacco, mark N.K., all of which realized 4d per lb.

TOBACCO-GROWING IN GERMANY.—Last year's crop of tobacco in Germany has proved so remunerative that the extent of land under this plant has been increased by upwards of 100,000 acres.—*E. Mail.*

CEYLON GEMMING COMPANIES.

It would seem as if there must have been a very strong divergence of opinion expressed in the Reports of the two experts who were sent from home to examine into the question of Gemming in Ceylon. Every endeavour has been made to keep the nature of these Reports from becoming public, and to a great extent this effort has been successful, for we are without the details of what has been written either by Mr. Barrington Brown or by Mr. Fahey.

As regards the gentleman first mentioned it seems to be certain that he regards the prospect before systematic Gemming in Ceylon to be satisfactory, he having been overheard to express that opinion to Sir Arthur Havelock at the meeting held in London to represent to our then new Governor, the views of those interested in this matter on the Gemming Ordinance passed by Sir Arthur Gordon shortly before his departure. But if the information which had reached our London correspondent may be fully relied upon, Mr. Fahey did not adopt so favourable a view, and the result is that those who sent him out to Ceylon have decided that it is not worth their while to incur further expenditure and have wound up the Syndicate formed to undertake preliminary investigation. In the absence of more authoritative information we must accept the matter as standing in this position. We cannot, of course, argue upon what Mr. Fahey may have reported consequent upon the very simple fact that we are without knowledge of the reasons which determined him upon making a report of the character he appears to have done. We may accept the statement that his Syndicate has closed its venture, as conclusive proof that the expert it employed has expressed an opinion adverse to further attempts by it. We should have much liked to know upon what the different views expressed by the two experts were based. We are told that Mr. Fahey, while admitting the existence of a large number of gems in Ceylon, did not think that the cost of systematic search for them could be repaid, to the extent, at all events, of leaving a margin for profit.

Mr. Barrington Brown, as we have said, is strongly of a contrary opinion. How far he may have reached such a conclusion upon the possible collateral profit to be obtained during the search for other minerals, such for instance as plumbago and mica, we cannot of course say. Little has been done as yet in the way of the importation of machinery for developing the mines formerly existent of the first mentioned of these minerals by the Company working on the Everton and other contiguous estates, but we have been told that time has not sufficed for this. Everything, however, now seems to promise that those who have invested capital in the first actual Gemming Company started will not have done so without profit. The question as it seems to ourselves to stand between the two experts is as to whether the search for gems *per se* can be made to pay, whether that can be attained without the collateral aid to be obtained from the development of other mineral resources possessed by us. While this question remains unanswered, we must be left wholly in doubt as to how far the expert opinions obtained on the prospects of gemming alone are antagonistic to each other, or as to how far they may run on parallel lines. One thing only is certain—that while those who employed Mr. Fahey have abandoned their project, the gentlemen who sent out Mr. Barrington Brown are still hopeful of future success. We suppose there can be no doubt that the latter expert carries more authority by virtue of special and varied experience. However, it seems probable now, that until full recovery has been made from the financial crisis which has lately overshadowed the London money market, we shall have to wait in our present condition of uncertainty. Much will doubtless depend upon the further success which may be achieved by the Gemming Company now at work. Of profitable returns, it has already secured a certain measure. Whether this will prove sufficient to warrant further investment in Gemming in Ceylon is more than can at present be said. When that Company issues its first Report, we may be in a position to write more certainly of the prospect before us; but at the present time we must hold our judgment in suspense.

TEA LEAD-PAPER.

We call attention to Mr. T. C. Anderson's letter respecting "Clark's Patent Paper Tea Lead" in answer to our remarks of the other day. We had forgotten how many testimonials to its good quality, Clark's patent paper lead had secured. In a private note Mr. Anderson says:—

"I have seen Mr. Seale of Messrs. Somerville & Co., and he says he has never heard of any unfavourable report on the paper lead, and that he uses it for samples. I regret that planters won't give it a fair trial. *I* do not want to make money out of it, unless it is universally adopted: and anyone may use it provided they use good lead and not ruin the thing by using perforated cheap lead."

In this connection and in regard to several other patents of value to tea planters, would it not be well to form a standing sub-Committee of the Planters' Association for 1891-92, to consider and examine all improved or economical means of cultivating, preparing and shipping tea that might be laid before them. It might be called "The Tea Improvements Committee." Many individual planters cannot afford the time to examine, or fear the risk attaching to, some new and perhaps good thing. Now a report by a disinterested, impartial Committee could not fail to be exceedingly useful as a guide all round.

CEYLON TEA FOR RUSSIA.

A PERMANENT RUSSIAN COMMERCIAL AGENCY IN COLOMBO.

The following translation of an editorial in a leading Russian paper will be read with interest:—

(From the *Novoe Vremya*, Dec. 1st.)

We recently wrote about the development of tea plantations in British India and Ceylon, which we ought to work to our own advantage and the disadvantage of China. We now find a very interesting paragraph in the St. Petersburg *Vedomosti* in connection with that subject. That paper says: "The enormous sums of money which we yearly pay for tea to the China merchants and the London tea brokers, could be profitably spent in arranging to keep up regular communication by our steamers between Russia and Ceylon. The business relations with China are getting each year more and more difficult, as the China men have quite adopted all the ways of usual business speculation, viz., as soon as the so-called tea season begins they all form a sort of confederation buying up all the new teas coming from the hills, increasing at the same time the prices for second qualities and condemned teas, which were not sold the last year. The European Agents getting uneasy about the non-appearance of high quality and new teas in the markets of Foochow, Hankow and Shanghai are easily caught in that trap and buy for high prices condemned or adulterated teas,

believing the assurances of the Chinamen that there are no superior qualities this season to be got. After having sold these lots, the good and new qualities begin to appear in the markets. By these or other tricks the Chinamen almost always succeed in deceiving the European buyers, who have more orders on hand than is possible to execute in a most limited time, and yearly those orders increase in proportion to the fast increasing number of tea-drinkers all over the world.

All this, says the *Vedomosti*, leads us to think seriously of opening new tea markets; and Ceylon appears the most convenient, for all of us drink now already unawares as much Ceylon as China tea, as our London brokers and agents use Ceylon tea most freely, almost half and half, for mixing up all the teas via London for Russia.

Further we must take into consideration that Ceylon may serve also as a market for some of our products. At a Conference which took place recently at the Ministry of Commerce the whole subject (here noticed) was duly talked over, and the Ministry of Commerce came to a resolution to open and confirm in Colombo a permanent commercial agency.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Dec. 11th.

ANNATTO.—For 50 bags good red seed from Ceylon 2½d per lb was refused. Twelve baskets Pará roll annatto were offered; they were of fresh import, but the quality was common and mouldy. After some bidding 9d per lb was realised for the lot.

COCA LEAVES.—The only lots shown in today's sales were 2 packages Ceylon leaves, good bold dark Huanoco character, undamaged, which sold for 5½d, and 9 packages Java leaves, very small, badly cured, brown and mouldy which were bought in at 6d per lb for the best.

ESSENTIAL OILS.—Two cases fair bright yellow Cinnamon oil realised 1s 4d per oz.; and 17 bottles cataloged as "cinnamon oil," sold without reserve for 3d per oz. For 50 cases Citronella oil in tins, ¾d per oz is asked, but there were no bids.

CEYLON PRODUCE IN RUSSIA.

The following letter addressed to our London Agents, and sent us to deal with, carries its own explanation, and we trust that Mr. Mandel will hear from Colombo merchants with the quotation he asks for: "Orel, Nov. 8th, 1890.—We are indebted for your address to a correspondent of ours and request you kindly to make us offers for Ceylon coconut oil, original tare, delivered at Riga. Kindly send me also samples of tea in ½ and ¼ chests. I have a considerable sale for the above mentioned articles and should be pleased to give you orders should your prices allow me to do so. Hoping to hear from you soon, I remain, Abraham Mandel."

NOTES ON PRODUCE AND FINANCE.

FRAUDULENT TEA MARKS.—Public attention is frequently directed in the Press to the frauds committed in the preparation of tea and the disregard of the Merchandise Marks Act. The *Echo* records the result of an interview with the manager of a leading company which imports and sells the tea from its own gardens. We were shown, says the writer, a row of twenty-seven packages of socalled "pure Ceylon tea," on the labels of which some qualifying words were printed in a far smaller type. It is the poor who chiefly suffer. They are induced to buy dust and sweepings of inferior China tea, mixed with the dust and sweepings of Indian Congou as pure Ceylon tea "blended with choice Indian and China growths." This last sentence is upon most of the labels printed in very small letters, or else at the end of the packet so designed as to mislead the purchaser, while affecting to conform to the letter of the law. Those who wish to lend their support to British-grown tea might look carefully into these packets and see for themselves what wretched subterfuges are resorted to cheat both the Indian producer and the English consumer. No one is inclined to take up the cudgels for the poor, out of whom a far larger profit is made than that obtained from the well-to-do and educated classes, who know the right quarters to go to. Much the same, in fact, is being done by unprincipled advertisers in the tea market, as by touting brokers in stocks and share. False descriptions and misrepresentations, added to unfairly large profits, will generally carry the day. Government appears powerless to stop the gambling in the one case and the cheating in the other, although both the "bucket-shop" keeper and the preparer of false labels not only err against the spirit but also break the letter of the law.

A TEA RESTORING MACHINE.—The question how to preserve the staying power of Indian and Ceylon teas has for years exorcised the minds of planters, brokers, and dealers. The constant cry in the "Lane" has been, "Give us tea which will not 'go off.'" We are glad to learn that Mr. J. D. Cahill, of Sea View, Sandycone, Dublin, a tea planter of experience, has lately patented a process and a machine for not only restoring tea which has "gone off" to its original freshness and briskness, but one which he claims will also materially improve tea which has been badly cured, or which is of inferior quality. We understand plans of the machine are already in the hands of the makers, and we hope shortly to be able to publish a full description of it. We hope that the desirable results claimed by Mr. Cahill may be fully maintained.

PREPARED COCOA.

A leading scientific journal specially devoted to chemical and analytical matters recently gave a short article upon the above subject, in which it was pointed out that cocoa is highly stimulating, but rich and somewhat indigestible, containing a large amount of fat known as cacao butter. To prepare cocoa for the table it is necessary that the amount of this fat should be reduced. This is attained by using one of two methods, namely—(1) the roasted and ground cocoa is mixed with starch and sugar so as to dilute its richness; (2) before grinding the cocoa it is heated and pressed, whereby a considerable amount (generally nearly one-half) of its natural fat is squeezed out. This latter method is decidedly the more desirable one, because not only is the fat removed, but all the other nourishing and stimulating principles are at the same time concentrated. A typical cocoa of English manufacture, which has always been constant in its nature, was recently found to possess the following percentage composition:—Fat=28·12, theobromine=0·95, natural starch, sugar, fibre, &c., =40·85, soluble albuminoids=6·61, insoluble albuminoids=14·73 (these are the total flesh-formers=21·34), natural mineral matter=4·94, moisture=3·80: total=100·00. To give a still more striking confirmation of these figures let our readers glance at the following average amounts of flesh-forming ingredients present in the substances named:—Natural cocoa, 13·00 per cent; good wheaten flour, 14·00 per cent; cocoa prepared with added starch and sugar, 6·00 per cent; cocoa prepared by extraction of fat, 21·00 per cent.—*Grocer*.

CINCHONA BARK.

(From *C. M. & C. Woodhouse's Report.*)

LONDON, Dec. 18th.

The market during the past month has continued quiet. The Dutch sale held on 13th instant, at Amsterdam, estimated to contain an aggregate of about 13½ tons sulphate quinine or 4·03 per cent. on the average, sold at easier rates, the unit being quoted 1⅛d to 1¼d. In London, however, at the auctions held this week, the value

of the unit was fully 1½d, possibly owing in some measures to orders being in the market to buy for speculation. During the past few weeks, meetings of the principal manufacturers of quinine have been held with a view of forming a combination to regulate the price of quinine. The representatives have, however, separated without arriving at any definite understanding. Only small transactions are reported in quinine, the latest sales being at 11⅝d to 11¾d for German on the spot, and 12¼d for arrival. The Amsterdam public sales of bark, are fixed for the following date next year, viz., 22nd January; 26th February; 2nd April; 14th May; 11th June; 16th July; 3rd September; 8th October; 12th November; 17th December.

COFFEE AND TEA FIGURES CONSIDERED.

TEA: HOME CONSUMPTION.

Ending October 1890, five months.			Then at this rate 12 months 1890-1891 would show as follows.
Indian	... 41,016,071	.. equal to	98,438,570 lb.
Ceylon	... 17,542,380		42,101,712
China, &c.	... 24,938,790	"	59,853,096
	83,497,241	"	200,393,378 lb.

Take G. W., & S.'s next Circular of 21st Nov. 1890 *re* Tea exported from United Kingdom for 10 months ending 31st Oct. 1890 and the figures for 12 months at the rate indicated would be.			Say H. C. and export, 12 months.
Indian	... 2,359,629	... equal to	100,798,199 lb.
Ceylon	... 1,328,461	"	43,430,173
China, &c.	...31,643,916	"	91,497,012
	35,332,006	"	235,725,384 lb.

Since compiling the above, G., W. & S.'s figures are to hand in gross, for H. C. and export for 6 months ending November: they are:—

Indian ...	...	50,081,487 lb.
Ceylon ...	...	22,102,654
China, &c.	...	44,719,286
Java ...	...	2,098,250
		119,001,677 lb.

being in excess of the above estimate and showing a still further advance in the rate of deliveries for Ceylon tea.

With a reduced crop estimate from India (Rucker & Bencraft in a late circular suppose they will receive in London from India 106,000,000; Ceylon 50,000,000, supposition of mine; China 63,000,000,* your Hongkong correspondent's figures—he says it is his estimate for "the whole year"—say 25 per cent less than United Kingdom required last year), U. K. receipts will probably not exceed 220,000,000 lb. against a possible 240,000,000 lb. required, unless the export from the United Kingdom of China tea further shrinks, as it probably will do. No allowance is made here for a very possible increase in the exports of India and Ceylon tea from the United Kingdom.

COFFEE.

British tea planters are apt to leave unstudied the position of their great Rival Coffee in Europe and America—here are some figures showing the gigantic preponderance of coffee over tea in the principal consuming markets of the world.

Rucker & Bencraft in their Circular dated 6th Nov. 1890 (see *Observer* 1st Dec. '90) state that in March 1890, the deliveries in Europe and America were 62,000 tons (*i. e.* 138,880,000 lb.) which "nearly coincides," they say, "with the total stocks in the TWO CONTINENTS" on 6th Nov. 1890.

James Cook & Co. in their Circular dated 22nd Oct. 1890. (See *Observer* 17th Nov. 1890) give total deliveries for 9 months ending Sept. 1890 at

in Europe ...	309,000 tons	
" America...	159,500 "	
Total..	468,500 "	for 9 months

or at the rate of 624,666 tons for 12 " *i.e.*—1,400,000,000 lb. or about 115 million lb. *monthly*

Strange to say J. Cook & Sons give stocks IN EUROPE, on 1st Oct. 1890 at about 60,000 tons—so one of these firms has fallen into an ERROR.

Rucker & Bencraft in their circular of Oct. 9th (see *Ceylon Observer* 30th Oct. 1890) give stocks on 1st Oct. "in Europe" 61,200 tons. In same Circular they say, the "deliveries (Europe and America) have been nominal—about 50,000 tons for the month"—large crops and ever increasing consumption. As far as I remember 8,000,000 bags* is the estimate of the coming Brazil crop, but even if it is on the trees will it ever be picked with labor only just made free? The Brazil planters evidently funk it and were getting some thousands of Chinese to help them, but did not late Rio News inform us that the Rio Government forbid their being landed and in fact ordered the ships with the Chinese on board to leave their shores.

Messrs. Jas. Cook & Co. in their circular of Sept. 24th, 1890 (see *Ceylon Observer*, 21st Oct. 1890) say "the deliveries (Europe and America) for consumption during the 8 months of this year are very good being 10,000 tons above last year, and nearly 17,000 tons in excess of those for 1888—the figures for the United Kingdom, however, are not so encouraging owing to adulteration." The Grand Old Man is mainly responsible for this. He surrendered at discretion, and the grocers carried *their right* to continue to poison the English working people!—His grand demonstration about pure coffee and tea was—PURE HUMBUG.

P. S.—I see the new Directory gives a comparison of lb. of coffee and lb. of tea. Your estimated consumption of coffee on Continent of Europe was 405,000 tons, a very close estimate indeed, looking at the actual figures above.

To open freely new tea acreages in India and Ceylon until new markets are more assured of, and China competition can safely be despised, would seem to involve some risk at present, cheap coffee *must* be reckoned with

* Japan too included here I believe.

* R. & B. in their last circular, published in the *Observer* of 24th Dec., say 8 to 9 million bags—involving a probable certain export to Europe and America of 7 million bags of 132 lb. each—truly a "bumper" crop.

COFFEE NEWS.

The coffee crop in Hayti this year is reported very large. The *Rio News* says that, generally good news from coffee producing countries this year promises to cause much lower prices for the next year or two.—*American Grocer*, Nov. 12th.

TOBACCO CULTURE PROHIBITED.—The Khedive of Egypt, on June 25th, 1890, issued a decree prohibiting the cultivation of tobacco throughout Egypt, and lands hereafter found to be under such cultivation will be subject to a fine equaling $1,000 per acre.—*American Grocer*, Nov. 12th.

THE KRYOLITE TRADE.—A revival seems to have taken place in the Kryolite trade, the Company which own the quarries at Ivigtut, Greenland, having found a new market for it in Russia. For some time the manufacture of products has been falling off and the Company had disposed of most of their vessels which traded with Copenhagen. Keeping up the supply, however, to Philadelphia where there are also manufactories. The result of the recent revival of the trade has been the re-employment of the Traveller (Captain Alexander Simpson,) of Peterhead, to carry two cargoes to Copenhagen next year, and to take out a cargo of coals. It is six years since this vessel was similary employed.—*A. F. Press.*

THE MADRAS AGRICULTURAL OUTLOOK.

A few districts in the Presidency are passing through a grave crisis at the present moment, and much necessarily depends on the state of the weather during the next fortnight, or three weeks. In parts of North Arcot, Chingleput, South Arcot and Tinnevelly crops over considerable areas will be lost unless there is an early fall of rain, and Government is already so far anxious as to think it necessary to call for special reports. As we remarked on the 26th ultimo, the distress is partial and local, and the rainfall average for the whole of a district is no indication of the true state of affairs in different portions of it. For instance, from the rainfall statement for October, just issued by the Board of Revenue, we observe that so far as regards the Districts mentioned above, in North Arcot the rainfall up to the end of that month was equal to the average of five years ending 1888-89; in South Arcot it was only three inches below the average; in Chingleput nine inches; and in Tinnevelly five inches. The greatest deficiency for a whole district was in Malabar, where it amounted to nineteen inches, while in Madras it amounted to twelve inches. The season has also been unfavourable in the Cumbum taluk of Kurnool, where paddy, ragi, and arika are suffering from want of rain. In Cuddapah the paddy is withering in the Badvel taluk, and the ragi in Madanapalle taluk. In Coimbatore the wet crops of Palladam, and the dry crops in parts of Coimbatore, Erode, Udamalpet, Palladam, Pollachi, Srtymangalam and Kollegal, are being spoilt by the drought, and the same is the case in the Uttankarai taluk of the Salem district. Altogether there appears to be cause for disquitude over considerable areas of the Presidency. If within the next few weeks the rainfall is not more general in considerable amount of distress will, we fear, ensue.—*M. Mail*, Dec. 11th.

ANALYSES OF TEA SOILS, MANURES, &c.

In quoting the following details from the proceedings of the A. and H. Society of India we would suggest that our Ceylon planters might avail themselves of the opportunity to have tea soils, &c., analysed :—

Mr. Francis Y. Ede, of Silchar, Cachar, wrote as follows :—I notice in the Journal of the above Society. Vol. VIII, Part IV, N.S., a memorandum on the analyses of Tea plants, Soils, &c. During the last ten years I have had occasion to draw some hundreds of samples of soil, analyse and report on the same with reference to their suitability for Tea gardens, their probable yield, etc. I have taken numerous samples from all the different kinds of land in Assam, Cachar and Sylhet and have kept, where available, a record of the amount of tea yielded by these soils and the condition under which the yield was obtained. If you think it would interst the subscribers to your journal, I could send you a few notes and memoranda on soils, their treatment, &c., in the tea districts.

Mr. Ede's offer was accepted with the Society's best thanks, and it is hoped that his good example will be followed by the many experienced Planters who are in a position to throw much light on many of the problems both in the culture and manufacture of tea which still remain unsolved. In a subsequent communication Mr. Ede wrote :—"I have to thank you for your letter of October 11th, and I quite agree with you as to the necessity of collecting and printing all information available with regard to the culture of the tea plant. It has been my opinion, for many years, that the application of a little science or technical knowledge would greatly benefit the tea industry. I have been working in a small way on those lines myself, and have been often astonished to find the good results produced; in some instances I have succeeded in doubling the yield of the plant. I am very glad that such a well known and much appreciated Society should take this matter up; there is plenty of scope, and I have no doubt there will be numbers of men who will voluntarily aid in the investigation. I for one shall be most happy to render any assistance in my power. It remains for your Society to determine the best method of carrying out these investigations and compiling and recording the information it may obtain from the various districts, in such a manner that it may remain as a permanent record for the benefit of all interested. This investigation must be carried out with thoroughness and exactitude in all the tea districts, only absolute facts and reliable observations being recorded. I should be happy to let you have my views on the way in which district investigations should be carried out."

Since the receipt of the foregoing letter from Mr. Ede, Mr. Bamber has arrived in the country. This gentleman has been engaged by the Society, in conjunction with the Indian Tea Association, to conduct the inquiries relating to Tea soils, Manures and Tea manufacture as sketched in the Memorandum published in the last number of the Society's Journal (Vol. VIII. Part IV.). Mr. Bamber holds the Diploma and Gold Medal of the Royal Agricultural College of which he has also been elected a Life Member. In addition to the original research, which it is proposed to conduct, it is hoped that much valuable information will be obtained from gentlemen like Mr. Ede, and that the collating and tabulating of such information will add much to the present knowledge of many obscure points connected with the production of Tea.

The control of the inquiries is vested in a committee nominated by the Indian Association and the Society and which consists of the following genetlemen :—Chairman, Mr. C. B. Garrett. Members, Messrs. J. N. Stuart, W. O. Bell Irving D. Cruickshank, Drs. Warden and King. Secretary, Mr. R. Blechynden.

An inquiry was received from Messrs. Mc Dougall Clark & Co., for books dealing with analyses of tea soils. They were informed that some analyses had been published in the *Tropical Agriculturist* and in other papers, but as they referred to to individual gardens, they were not enough to generalize upon; and the action now being taken was alluded to.

PLANTING AND SHOOTING IN PEERMAAD.

The South-West monsoon has been, as I prophesied it would be, one of the lightest on record, and though the North-East, with its attendant cyclone, did its level best to make up for any shortcomings on the part of its elder brother, the total rainfall up to the end of last month only amounts to 104·80 inches; out average being about double this amount. To both coffee and tea, the mildness of the monsoon has been favourable; to the former especially so and—if I had one—I would bet my bottom dollar, that a few successive years of mild monsoons, would effect a radical change for the better in the productiveness of the coffee estates in this district. The season's crop, which is now being gathered, is, with one or two exceptions, decidedly short, owing chiefly to the high winds and storms that prevailed during the blossoming season, but the general appearance of the estates is satisfactory, and the outlook for next year decidedly promising. An instance of the wonderful effect produced on shuck coffee by the judicious planting of belts is worth recording. One of the oldest properties up here, planted early in the "Sixties," was some years ago well-nigh played out; crops had become beautifully less, and the proprietor's heart was sad within him; a happy thought, however, struck him to try belts, and he promptly set to work, and planted up rows of *Grevillea Robusta* over a large portion of the estate. These have now grown into fine trees, and the effect on the coffee has been simply marvellous. It seems to have taken quite a new lease of life, and though, doubtless, the shelter and partial shade afforded by the belts has been highly beneficial, there can be no possible doubt that there is *something* in the *Grevillea* that acts on coffee as a most

wonderful tonic. With the gloomy accounts one hears from various coffee districts, it is cheering to have to record the fact that some new clearings for "Coffea Arabica" are to be opened up during the coming season, thus proving that in spite of past years of leaf disease and short crops, there are some, at any rate, who have not lost their faith in the old King—" So mote it be." The steady increase in the yield of tea, and the good averages obtained are highly satisfactory. Further experiments in the manufacture of green teas have resulted in further successes; but as these have already been chronicled in the columns of the *Madras Times*, I need not here further allude to them.

* * *

Our local shikarries have not done very much in the way of shooting lately; but two visitors from Ceylon had very fair sport during a short stay of about three weeks, and succeded in bagging a couple of tuskers, a few bison, sambur and ibex and a leopard.

P. S.—Since writing the above, there has been an extraordinary change in the weather, which can only be accounted for by some peculiar atmospherical disturbances in your part of the world; and which to have reached us must have been, I imagine, somewhat severe. The land wind has suddenly stopped, and we have had very heavy showers, accompanied by thunder and lightning most unheard of occurrences at this season of the year,—*Madras Times*, Dec 17th.

PLANTING IN WEST BORNEO.

Sir,—The tobacco planters now in Sambas seem to pin their faith to the low alluvial land along the lower reaches of the Sambas River, and none of them seem inclined to give the Sanggauw district another trial, which, I think, is a pity as there can be no comparison between the two soils—that of the lower land consisting of from 6 inches to a foot of humus on the top of a rather stiff subsoil, whereas in Sanggauw you have a rich chocolate colored soil of great depth and of volcanic origin, there being the crater of an extinct volcano close to the Simadrem Estate. Given a fairly dry season, and clearing on land less shut in and at a lower elevation (and there is any quantity of such land in the district) and I cannot but think that a finer quality of tobacco would be produced at only a slightly decreased yield.

There are several contracts held in Sanggauw district, and one gentleman has a very successful pepper clearing near the Sanggauw Kampong, at an elevation of about 500 feet, and pepper and Liberian coffee have been also planted at "Sakong" near the foot of Gunong Baiang at about the same elevation, and I am told both are doing well.

Liberian Coffee grows well in this soil, and crops abundanty, although, when planted by the Sultan, it had little care taken of it, and I have never seen finer pepper of the same age than that growing in many of the native gardens in and about Sanggauw.

The climate also is delightful; and I may here mention that the healthiness of Sambas is one of its greatest recommendations to planters and miners—in fact the death-rate for the whole of Western Borneo is very low.

One thing in connection with the planting enterprize in Dutch Borneo surprises me, and that is that the tobacco experts have confined themselves to Sambas territory in selecting land, while only 100 miles further south in the Pontianak and other districts there are hundreds of thousands of acres of equally good land along the Kapoeas River, and if anything more favorably situated with regard to transport and communication, there being three steamers running regularly between Pontianak and Singapore, a run of about 38 hours, while there are besides several large launches running up and down the Kapoeas river, which is navigable by fair-sized steamers for between 300 and 400 miles from the mouth.

The climate as far as I know, is the same as Sambas. If, as I hope, tobacco planting proves a success in Sambas, we will see all the land referred to above taken up; and I consider there is a great future for this part of Borneo in planting alone, to say nothing of the mining industry, which for the present attracts more attention than the planting. Next week I will send you a few notes on the mining concessions.—Yours &c.,

KAMBAR.

West Coast, Dutch Borneo, Nov, 1st, 1890.

—"Times of Ceylon."

SEVERAL EXPERIMENTS have this season been made in Virginia in growing teosinte the new southern forage plant. It is said that one grower has exhibited a bunch of teosinte which was very promising. According to a report it was "about 7 feet in height and has some 30 or 40 stalks all from one grain of seed." The producer calls it the greatest fodder plant he ever saw, and alleges that he has fed two milch cows through the summer from less than half an acre; and has still a quantity left.—*Indian Agriculturist.*

AN ENORMOUS TREE.—A correspondent of the *Scotsman* writes:—There are at present ten skilled workmen busily engaged taking out a section of an enormous redwood tree in the Mammoth Forest, California. The section to be taken out will be 9 feet in height, and will be divided into three cuts. The tree, which grows 6,325 feet above sea level, measurss 99 feet in circumference and nearly 33 feet in diameter. The saw used in getting out the section is 22 fest long, and requires eight men to handle it. Two months will bs nseded to complete the work. The sectiont are to be shown at the great World's Fair as Chicago in 1893. Three flat cars will be necessart to transport them, as their total weight will noy bs less than 20 tons.

ARTIFICIAL COFFEE BERRIES.—The art of adulteration has made furthsr progress. Many persons buy coffee whole, thinking that by grinding the berries themselves they avoid all risk of adulteration. It is so easy to mix with ground coffee chicory or other less inoffensive ingredients. M. Ludovic Jammes, inspsctor, reports, however, in the last issue of the *Revue d' Hygiène,* that a number of commercial travellers are offering retail grocers coffee berries at a prics which yields 60 to 100 per cent more than the usual profit. Good coffee is at present very dear, and when the tradesman expresses his surprise, the commercial travellers, so as to cover their legal responsibility, explain that the berries are artificially manufactured, and to avoid detection should be mixed with real coffse. M. Jammes gives, however, minute details to facilitate the detection of this fraud. The slit in the false berry is nsither so long nor so deep as in the real berry. The colour is well imitated, but the false berry doss not feel so smooth; it is also much harder, cannot be so readily broken with the teeth, and is oftsn hollow inside. A real coffee berry can be easily broken by introducing the nail in the slit, while the false coffee will resist very hard pressurs. The false coffee has a somewhat faint and nauseating taste. It seems to be composed of vegetable glancs and the flour of some cereal. A paste is made with soms such mixture, placed in a mould, and torrefied. The fraud is therefore absolute; the berry does not contain even the smallest percentage of coffee. It is to be hoped that thsse revelations will put an end to this fraudulent trade, otherwise the French will soon lose the reputation they have so justly won of being the best coffes-makers in the world.—*Lancet.*

A HOLIDAY TRIP TO LABUGAMA LAKE:

THE SOURCE OF THE COLOMBO WATER SUPPLY.

WITH NOTES ON THE VEGETATION AND PLANTING OPERATIONS OF THE NEIGHBOURHOOD.

It is to be regretted that the beautiful scene whence the capital of Ceylon derives its supply of mountain-born water (of a purity unexcelled) is not more facile of access. The Lake which has been formed by damming up the Wakoya (the "crooked stream," as the Dikoya is the "long river") is nearly 28½ miles from Colombo. Over 19½ of those are along the Ratnapura road, to about 1½ mile beyond Hanwella, and to this point the mail coach is available. But there are no horse carriages to be hired at Hanwella, only bullock hackeries to do the 8¾ miles of road which were made specially for the purposes of the waterworks. This road turns off at right angles from the high road at Wakoya, 1·54 mile beyond Hanwella. If, as in our case, a party of four can be made up, we can testify to the comfort of the waggon and the excellence of the horses which Messrs. A. Pate & Son can supply. Starting from Colombo on the morning of the 2nd at about half-past 6, we reached Hanwella at 9, and we could have got to Labugama by half-past 10, and returned the same day to Colombo, had we not formed other plans. We must warn any inclined to make the trip, that, although they may find accommodation at Labugama, in a Government building which is used as a resthouse, when not required for purely Government purposes, they had better take provisions with them from Colombo, if they do not follow our example and breakfast at the very nice and commodious resthouse at Hanwella. Even so, information ought to be sent in advance to the resthouse-keeper. With such an arrangement, visitors to the Lake could return to a late tiffin at Hanwella, and then back to Colombo. If they arrange, as we did, to dine and sleep at Hanwella, the enjoyment of the trip will not be marred by fatigue,—the more especially if our example be further followed in floating down the Kelani ("pleasant") river by boat. The resthouse-keeper could get a boat ready; and if there was any difficulty we have no doubt that other Europeans would benefit as we did by the courtesy of Mr. Ameresekere, a most intelligent Sinhalese gentleman, who is a planter and contractor for cutting, carrying and storing timber at Hanwella from the Government forest reserves, of which one block near Labugama extends to an area of 5,000 acres. I may as well mention here that although "wa" is by the Railway Department classed highest amongst firewoods, Mr. Ameresekere agrees with Col. Clarke that this tree is too valuable as a cabinet wood to be used for the furnace, for which purpose he gives the preference to "mendora," the calorific qualities of which are increased by the resin which permeates the fibres of the wood.

We should have got to Hanwella at ½ past 8, but for the fact that our driver, instead of taking the short cut, via Urugodawatta to Ambatale, took us the old route by Grand Pass and then along the road parallel with the Kelani, which crosses the canal near the Bridge of Boats. We were, in the end, glad that this route was chosen, as we thus had the opportunity of appreciating the magnitude of the raft and boat traffic on the river, in bamboos, timber trees, fire wood, coconuts (which fruits in the husk we saw floated down on rafts), bricks, tiles, &c., of which there are well stocked depots along the sides of the canal and road. We could not help noticing, as competing even with salt fish in appeals to our olfactory nerves, the odour of timber in course of conversion after being seasoned in water. The sourness of the timber smell was a striking contrast to the strong and occasionally semi-putrid odour of the fish. The value to Colombo of the cheap water carriage for fuel, timber and building materials generally, afforded by the Ke'ani, is far greater than many of us imagine. The bricks and tiles are manufactured mainly at Pannebakkery (*Anglice*, the Pan Bakery), where excellent clay for the purpose abounds under a surface stratum, more or less thick, of red mould. Here the Government had an establishment for the manufacture of bricks and tiles, so long ago as 1837; and one of the first incidents of my career in Ceylon was a visit to this place, then under the charge of a Corporal Ross of the 78th Highlanders, who had been left behind when his Regiment was removed from Ceylon. My recollection is still vivid of the huge elephants being compelled to use their broad feet in puddling the clay, their constant efforts being to step into the hollows previously made while the object of the driver was to compel them to put down their feet where the soft and adhesive clay was thickest, against which they occasionally entered protesting growls. The huge bulk of the animals' bodies and the resemblance of their long thick legs to cast iron columns made a strong impression on my mind which time has not effaced. All the way from Pannebakkery to Hanwella, good quality tenacious clay unmixed with siliceous particles, is found at intervals, on which diggers were at work. We were puzzled to see masses of puddled clay near the cottages on the roadside all the way to Hanwella until enlightened by Mr. Gibson at Labugama on an important point in engineering, of which I am ashamed to say I was previously ignorant. It appears that clay subjected only to a process of puddling and then used in building a bund is valueless, because liable to be washed away. The moist mass requires to be "weathered": reduced to dry particles. These are again moistened before being utilized, and thenceforward the mass, having dried and hardened, is as impervious as rock. One of the circumstances which added largely to the cost of the bund of the Labugama Lake, was the fact that the puddled clay used in its construction had to be transported all the way from Hanwella by carts, all attempts to find suitable material nearer at hand having failed,—sharp, sandy particles intermixed rendering the clays unsuitable. Before reaching Pannebakkery, we were interested in identifying, a little up the western bank of the river from the Bridge of Boats, the site of Orta Seda, or Sedawatta, where formerly there were botanical gardens, in which mulberry trees for the feeding of silkworms were grown. And this reminds me of the wrong spelling of Embulwatta, a village about 3½ miles on the Colombo side of Hanwella. The place has undoubtedly derived its name from the gigantic scarlet-blossmed cotton trees, conspicuous on the road and which serve to mark the divisions of korales. The name, therefore, ought to be written and printed Imbulwatta. Passsing the outlet of the Mulleriyawa tank, before reaching Kaduwela, we regretted that the time at our disposal did not permit of a visit to one of the few important irrigation works in the Western Province and one which is within easy reach of the capital. There is a nice resthouse at Kaduwela, prettily situated on a rise in the river bank and commanding a view of a great rock which juts out into the river from its eastern bank and of one of the largest sandbanks in the river, on parts of which vegetation, including bamboo. has commenced to grow. There is a ferry from Kaduwela across to Malwana, a classical scene in the history of Ceylon, a visit to which was the main object of our down-river return

trip, and the incidents of which visit will be noticed subsequently. Meantime I would remark, that, as Kaduwela is only about ten miles from Colombo, a trip thither is calculated to be interesting and enjoyable to those who appreciate river scenery and rich tropical verdure, and who take an intelligent interest in the history of European connection with Ceylon: Portuguese, Dutch and British, as connected with the opposite remains of Malwana. The tree vegetation is richly luxuriant in the fertile alluvial soil deposited on the banks of the river, and the grass meadows which occasionally stretch away on each side are calculated to remind the traveller of English hay and clover fields, while the gradual transition from the flat country to the lower ranges of hills adds special interest to the journey. The prevalence of inconvenient but fertilizing floods in the Kelani valley, is indicated by long rows of guide-posts along the sides of the road, by which mail coaches, carriages, carts and foot-passengers are enabled to steer their way, when the waters are out, as a consequence of heavy and sudden rain-storms on the Peak ranges, from which to the sea the course of the river is not much more than sixty miles. The lower portion is lake-like in breadth and fulness; but at about eight or ten miles from the mouth frequent and sometimes formidable sandbanks commence, by which the stream is compressed into narrow channels. The rapidity and force of the stream is, of course, in proportion to the narrowness of the orifice; and while rafts, and especially boats, float easily downstream, the difficulty of the navigation upwards may be judged of by the fact that while five hours on the water amply sufficed for our course of about 20 miles from Hanwella to the Bridge of Boats, 2½ days would be required for the poling upwards. In the case of large and heavily-laden boats (and we were interested to see that besides rice the cargo of one such boat consisted mainly of Japan-made* shooks of tea boxes) the difficulty must be much greater, of which indeed we had proof, in the desperate exertions and wild, plaintive cries of the polemen as they painfully urged their boats against the rushing water. Some of the cargo boats had masts, but we saw no sails actually used. The north-east wind was, probably, far too gusty for safe sailing. The usual voyage upward of boats carrying rice and other supplies for the Kelani Valley tea estates from the Bridge of Boats to Yatiyantota is ten days, and occasionally a fortnight is occupied in the transit. This is slow work, but probably neither cars nor railway carriage could compete with that on the river in cheapness. The contrast between the hard labour of the upward-voyaging boatmen on the river and their lounging, lazy countrymen in the villages on shore was striking. But no doubt the latter work hard in spurts, while the boatmen have compensation for the hard work up in the easy floating down. One conclusion forced on us by an examination of the great river for twenty miles of its course was the non-feasibility of dredging and keeping a navigable course open up this stream, at any but a prohibitory cost. The deposits of sand and silt are in some cases enormous, and we could see evidence of great erosion of the banks and shifting of soil from one side to the other. There can be no question that the felling of forest and the cultivation of tea estates along the upper portion of the river have tended to increase the impediments to its navigation by the quantity of silt washed down. And insanitation—temporary only, let us hope—has followed. On asking our good friend Mr. Amerasekere as to the health of Hanwella, he stated that previously to the advent of the lowcountry tea enterprise the place was eminently salubrious, but that the change for the worse in the last five years had been marked. It is to be deplored that the advance of enterprise and material civilization, which cannot and must not be stayed, should involve such consequences,—in the inconveniences of which the planters and their coolies fully share,—and we can only hope for a speedy amelioration of climate or the discovery of a potent enemy to the organisms connected with what we call "malaria."

The once important Fort of Hanwella, situated on what, up to the cession of the Kandyan Provinces in 1815, was the borderland between "the Maritime Provinces" and "the Kingdom of Kandy," is interesting from the natural beauty of its situation and the associations, ancient and modern, connected with it. Malwana, in the Dutch period was burnt and its small garrison of invalids massacred, the destruction thus effected, and which led to war between the Dutch and Kandyans, accounting for the few vestiges remaining of the fort and the palatial country-houses of the Portuguese governors. Hanwella, although the Kandyans, in 1803 took possession of the fort and village, was not long in their hands. After three days' occupation, the Kandyan forces were ousted and driven back with great slaughter by troops from Colombo, under the command of Lieut. Mercer of H. M. 61st Regiment. The British troops seem, on this occasion, to have been aided by an auxiliary body of loyal Sinhalese collected by Mudaliyar Solomon Dias Bandaranayake. After the massacre of the British troops in Kandy, the elated traitor-king marched his army against Hanwella. But the small fort was held by a soldier of a different stamp to the wretched Davie. Capt. Pollock, with his small force, not only held his own, but became the aggressor, repulsing the enemy, who made a precipitate retreat, after great loss of men, arms and ammunition, and the abandonment of the royal standards. Very different and altogether pacific are the recent associations connected with the place in the successive visits to it, in 1870, 1876, and 1882, of members of the British royal family, in the persons of the Duke of Edinburgh, the Prince of Wales, and finally the two young Princes, Victor and George of Wales. All the royal visitors planted trees—jak, nuga, bo, mango, &c., four at least of which are flourishing, inside circles of laterite and cement. As records of the visits and the tree planting, there are inscriptions on three stone seats which are so placed on the rampart which faces the river, as to command beautiful views across and up and down the stream. The river takes a bend below the ferry, but upwards there is a long reach, the fine vista being closed by a grand background of the Adam's Peak mountains. The view of these, as dawn was breaking and the clear and increasing light revealed their features, before the sun had produced any curtain of haze, was exceedingly striking, contrasted as the blue of the distant mountains was with the silvery waters of the stream and the rich verdure of the vegetation in the foreground. The crisp temperature here on the morning of January 3rd, following a night of special coolness, almost made us fancy ourselves back in the mountains which are "round about" Nuwara Eliya, although the elevation above sea-level is only 40 feet. At 2¾ miles from Hanwella, indeed, en route to the mountain Lake where

* Made in Japan, out of timber from the forests of that island kingdom, by means of American machinery, and used for the packing of Ceylon tea,—surely a romantic incident in the free commerce of nations!

amidst the ranges over which Labugankanda (height nearly 1,500 feet) presides, we had only attained an elevation of 75 feet, the rise in the following six miles being to 306 feet, the level of the "top-water" of Labugama Lake. But we must dispose of Hanwella, famous, amongst much else, for a fairly successful experiment in teak cultivation. We can remember the grand old trees which were so injudiciously sold and cut down some thirty years ago. There is still a fine grove of these valuable trees, coppice and original growth, the light-coloured foliage of which contrasts strikingly with the prevailing greens, many of them dark, like the jak, of the indigenous and ordinary trees. Amidst the teak grove and outside the fort (the resthouse stands within its bounds) is the large and well stocked timber depôt, the timber in which, we understood, was entirely reserved for Government purposes, none being here available for sale to the public. We were interested to learn that a considerable quantity of teak seed gathered from the older trees at Hanwella, had been sent to Batticaloa, in the neigbourhood of which a fairly successful experiment in teak-growing had previously been made. It is to be hoped that the officers of the Forest Department may succeed in naturalizing *Tectona grandis* amongst our forest resources, for few trees surpass it in value. We should think that any quantity of seed can be obtained from the now grandly grown trees in the teak forest, which was formed on the west coast of the Madras Presidency by the Marquis of Tweeddale and the value of which, as time advances, has been computed at millions sterling. The experience obtained on the Anamallays, as to suitable soil and climate, cannot but be of great value to Ceylon. Amidst all the tree vegetation around Hanwella, bird-life is abundant; and we here enjoyed a woodland concert of mingled and melodious sound, unknown equally to dwellers in towns and the occupants of bungalows at extreme altitudes in the mountains. I am bound to admit, however, that the first herald-sound of approaching daylight, if not the last as "the gloaming" gave place tonight, consisted of raucous utterances of the ubiquitous and ever-in-evidence crows,—so unfavourably prominent with their fellow scavengers the pariah dogs in Sinhalese sannass: "May he who violates the terms of this gift, be born next in the form of a dog or a crow." The association is somewhat unjust to the crow on the score of addiction to water baths, for which the crow is famous. On the score of voice there is little choice between the two. Hanwella has, it seems, superseded the proper Sinhalese name of the place, Gurubewila, just as Welgama is now the commoner name of the place which the Portuguese and Dutch knew as Malwana. And here a fitting pause can be made before describing our journey in the hills amidst the solitude of which slumber the mirror-like waters of Labugama Lake, and the voyage down the river named after Kelani, the site of the ancient Buddhist shrine, a place so "pleasant," that Hindu legend represents the sun as pausing in admiration, as he comes over it in his diurnal course.

The road constructed by the Public Works Department specially for the purposes of the Waterworks, and which extends to a distance of 8¾ miles from Wakoya to the northern end of the Lake at Labugama, cost, including a sum of over R11,000 for land, a total of R175,000, or very nearly R20,000 per mile. The estimate in this case was exceeded by R100,000. At its commencement the track runs through valuable paddy lands and native gardens, whilst the upper portion had to be cut through the lower hill ranges, the mountain streams requiring bridges strongly founded and with openings large enough to allow free passage to the exceptional floods to which this region is specially liable. To such bridges and the sides of other openings, all the way to Colombo, the main pipe is to be seen attached, resting on rollers to allow the movement, slight though it be, produced by expansion and contraction from changes of temperature. During the period in which the work of Lake clearing and bund construction was carried on, flood water has been known to rise up to 17 feet over the level of the road; and it was affecting to learn how Mr. Burnett, suffering from lung disease of a serious nature as he was, rode and boated and waded through the waters of such a flood, in his anxiety to save the works from threatened destruction. That was the last and fatal blow to a constitution weakened not only by physical disease but by anxiety and repeated disappointments connected with the "service reservoir" at Colombo, which, however, he lived to see, with the rest of the great and beneficial scheme he had carried out, a perfect success and one of the greatest triumphs of modern hydraulic engineering: and that too, at a comparatively moderate cost. Visiting Labugama, as we did, on an intensely hot day (the walk up the zigzag path to the Engineer's bungalow about 2 p. m. was an experience easier to recollect than to endure), we could scarcely realize that Labugama forms part of the very rainy region which surrounds the Peak and extends from the sacred mountain as a centre along its flanking ranges and through the river valleys between them. The average annual rainfall, established by ten years' observations at Labugama, is, in round numbers, 160 inches, the deposit in 1890 having exceeded this average by 5 inches. The extremes have been between 187 inches in 1882 and 138 in 1888. The years 1882 with 187 inches and 1883 with 185¾ must have been terribly trying to the Engineers and the force of labourers engaged on the construction of the bund (just commenced), for work had to proceed continuously, and in digging exceptionally deep for a solid foundation all the expedients of scientific experience had to be resorted to, in order to avert the destructive effects of flood waters. With such a rainfall as we have indicated, continuous for a large portion of the year (the lowest average monthly rainfall is 4·42 inches for January), it might be supposed that the Lake (176 acres in area) would receive practically the whole of the rain falling over the "catchment area" of nearly 2,400 acres, in which there are no human abodes save the resthouse to which we have referred with the residence of the Engineer in charge and lines for a few coolies, all at the northern end. But the absorption of rainfall by the soil and vegetation have been on the scale thus indicated:—

In 1887, out of a rainfall of 174·89 inches, the loss from absorption was 42·55 inches, or very nearly one-fourth of the rainfall, the exact percentage being 24·32.

In 1888, the year of lowest rainfall recorded, out of 138 inches of rainfall, the loss was 31·29 inches, or 22½ per cent of the rainfall.

In 1889, with a rainfall of 159·28, the loss was 31·33, or 19⅝ per cent.

If such are the proportions of soil and vegetation absorption in one of the wettest portions of the island, readers can understand the much greater influence of this process in the dry and arid regions where the irrigation tanks are situated. Streams of limited size and originating in the lower and hotter "foot-hills" on the northern and eastern sides of our mountain

system cease to be perennial, and no wonder, when two, and we believe three, years of drought occur in succession. The tanks are then dependent entirely on rainfall; and considering the dry condition of the soil and the thirsty state of vegetation, we can understand why, for the re-filling of such a tank as Kalawewa, rain-storms of 10 to 20 inches in a few days are desiderated rather than the same quantity of rain distributed over a month. In the latter case the arid soil and the drooping vegetation would gradually absorb every drop of moisture that fell, leaving none to even partially supply the tank. But not only must the loss from absorption be greater in the dry regions, say 35 per cent. at least of the rainfall at Kalawewa, against 22 to 25 at Labugama, but the further loss from evaporation, which is astonishingly great in the cases of the Colombo and Labugama Lakes, must be enormous in regard to the streams and irrigation reservoirs in the hot, dry regions where the shade temperature goes up to 100°, and months succeed months, sometimes, when the heavens are as brass and the earth as iron. In Mr. Blanford's book on the climates of India and Ceylon, we have been surprised to find how few and uncertain the data quoted by him for evaporation are. Extended and careful observations by the Survey Department in connection with the Colombo Lake and by the Engineer in charge in the case of the Labugama Lake, on a system—in this latter case, inaugurated by the late Mr. Burnett—are likely, as Mr. Burnett pointed out in his most interesting final report, to give results of unique value to hydraulic science. Readers will be scarcely prepared to learn that the average daily evaporation from the Colombo Lake, with a mean temperature of a little over 80°, and an annual rainfall of 88 inches, is equal to 0·217 of an inch (the total area being 416 acres) or 2,045,589 gallons; the maximum evaporation on a dry day in February being 0·480 inch, or 4,524,804 gallons. Such, however, are the results of observations taken by Mr. Wackrill of the Survey Department. The decimal given for a dry day in February, be it noted, is very close on half-an-inch. We understood from Mr. Gibson, the experienced and intelligent Engineer in charge of the Labugama Lake, that he takes the most frequent and careful observations of the effects of evaporation on the mountain reservoir of which he is in charge, the extreme effect in one day being, we understood, ⅜ths of an inch. This is consistent enough, the mean temperature of Labugama being about the same as that of Colombo, but the atmosphere being so much the more charged with moisture in proportion to a rainfall of nearly twice the volume of that at Colombo. I cannot, in this connection, refrain from quoting the following paragraphs from the late Mr. Burnett's exceedingly able, honest and interesting report:—

The supply to the town at 3,000,000 gallons in twenty-four hours with strainer washing and scouring of wells, flushing, &c., absorbs about 33 to 34 in. of the rainfall.

The proper maintenance and working of the Reservoir, therefore, require the constant care and attention of a skilled and thoroughly reliable European officer at Labugama every day, and frequently at night, as the floods must be met and dealt with by the sluices when and as they occur; and it has been, and will be, only by the best and constant care, both days and nights when required, of the officer in charge in carrying out his instructions that the purity and safety of the water supply, which has now become a vital necessity to the people of Colombo, can be insured.

In the course of his work and inspection this officer is required to take, not only a daily record of the rainfall and level of the reservoir, but such constant observations both of rainfall and reservoir levels and opening and closing of sluices, as will enable a complete calculation to be made of the rainfall and the measure of its resulting flow of water, and the receipt into, and discharge from the reservoir of, this water. It is only on this knowledge that the volumes and duration of floods, and their proportions of yield of water to the rainfall, can be ascertained, and that the measures to meet them can be arranged.

The observations thus made enable both the total yield of the year's rainfall to be ascertained and the details of individual storms and floods, and give most important scientific information of, I believe, almost unique value as to the yield of rainfall in water discharge and the loss by absorption in the ground and by vegetation and evaporation in tropical mountain valleys. It is extremely rare in such conditions that the entire results of rainfall and discharge can be measured into a reservoir, as at Labugama, from such an area as a drainage of nearly 2,400 acres, and they should be of great value in the consideration of all works and matters connected with the discharge of the streams of the mountain and hill districts of this Island as well as elsewhere where similar conditions exist. These returns, both of the total annual results and particulars of exceptional floods, should form a part of the annual report of the Engineer.

As the road to Labugama pierces the outlying hills of our mountain zone it crosses the beds of several streams, the multitude of large boulders in which show the evidences of exceptional floods. The Wakoya is not the largest of the streams. It is excelled by the Kalatawa, the waters of which, however, could not be utilized for the formation of the Lake, owing to the lower level of this river. The road to Labugama has helped to open up the country around to the tea enterprise, and strikingly contrasted with the flat paddy fields near Wakoya were the tea fields on some hill slopes that for steepness could compare with some of the cultivated precipices in Haputale, which the railway will skirt as it approaches, over the narrow ridge along which will lie its final course, "the Pass" by which Uva is entered. "Mohideen's tea estate" (inscription on a board by the road side) looked so ship-shape and clean that we were curious to know about the exceptional "Moorman" who was so good a planter. The answer was "Mohideen's estate is looked after by Mr. Ross Wright." "All right," was our natural response. Young coconut palms, planted amidst tea, or as a separate cultivation, looked flourishing, but scepticism was expressed as to the trees' bearing well so far from the sea. The distance from the sea in a direct line being not more than twenty miles, the question arises as to the limit, in distance from the saline influences of the ocean, of profitable coconut cultivation. The best zone for the palm is usually defined as two miles from the sea, but coconut cultivation in many parts goes much further inland, extending in the case of the valley of the Kelani in unbroken groves along the banks of the river, from its mouth to Hanwella and still further towards Ratnapura. Many of the fine and flourishing coconut plantations beyond Mirigama must be more than twenty miles from the sea. In southern India the destruction of coffee by borer was traced to the fact that the cultivation had taken place on "bamboo-land,"—*Bambusa arundinacea* being, no doubt, the species in that case. Along the road to Labugama and in the Kelani Valley generally, the prevalence of the small bamboo of which tea baskets are made in such large numbers at Kalutara, and which is used so generally for fences in Colombo and elsewhere, seems to have no deterring influence on intending cultivators,—a considerable proportion, indeed, of the Kelani Valley tea estates being opened on land, the main vegetation of which

was the *Bata* bamboo. The elegant areka palm is at home in this region and the drive is altogether a pretty one. The approach to Labugama is indicated by signs of lessened traffic in the shape of a green grass covering over the grey gneiss "metal," which latter might seem superfluous if the size of the spare pipes lying alongside the road at intervals did not remind us of the heavy weights the road had to bear and many have yet to bear, in case of damage to the water supply source by exceptional floods. Those who constructed the road for the purposes of the Waterworks could scarcely have anticipated, even in their wildest dreams, the convenience it will prove. if, as is believed, an elephant kraal is arranged at Labugama in honour of the approaching visit of the heir to the imperial throne of Russia. The completion of this road will enable the Governor and his guests—the Tsarevitch and his suite and others,—to drive uninterruptedly over the 28½ miles from Queen's House to the margin of the Lake. Then the boat will be ready for the mile of Lake, and the horses which will be waiting at the southern end of the water will carry their riders by a well-cleared path, over the distance of 1½ mile to the intended scene of the "kraal," into which the now freely roaming and peacefully feeding monarchs of our forests are to be driven for human delectation—for the gratification of that hunting instinct which clings so tenaciously to our nature, even in those highest in rank and most advanced in civilization. The resthouse and Mr. Gibson's bungalow are likely to be utilized for the lodging of royalties and vice royalties, while there will be, of course, the usual temporary "Kraal Town" formed of cadjans, bamboos and similar materials. The kraal, if held, has every chance of being successful, for there are three herds of elephants, with which Mr. Gibson has established relations as amicable as those which now exist between the British lion and the Russian bear, and the benefit of his intimate knowledge of the haunts and habits of his friends of trunk raising and trumpeting fame cannot but be of great value to the leaders of the forthcoming "Keddah," as they call a "Corral" in India. The four-feet path formed round the margin of the Lake is, for the present and with reference to the approaching kraal, closed to the public, and we saw a few coolies going over its course with reference, we understood, to clearing it of all obstruction. To a Prince amongst whose future dominions the Caspian Sea is but one of many inland Lakes, the artificial lakelet of one mile long by about a quarter broad, in the Labugama valley, may seem but "a little one." But seldom in his travels can the Tsarevitch behold a scene more lovely, more intensely brooded over, normally, by the genii of silence and solitude—silence and solitude which will of course give place to sounds of genial festivity, when the representative of British royalty entertains in wildwood hospitality the heir of a monarch who, in a martial sense and the sense of owning a vast portion of the earth's surface. is amongst the most puissant of "Great Powers." But it seemed to us, on the occasion of our visit, almost desecration to break the silence of hill and forest and fluid, all sleeping around us as we glided in the hours before gloaming over the mirror-like surface of the impounded waters, not of the Wakoya alone, but of many other minor streams, distinguishable by the little "bays" and the better grown groups of forest trees at their inlets into the Lake. We were interested to learn, however, that submerged by the waters over which we floated were the site of a former village and a few rice fields. A small tope of coconut palms on the shore of the Lake had been levelled by elephants for the sake of the grateful food yielded by the tender tops of the trees. As we approached the northern end where the waters of the Wakoya lose themselves lovingly in the bosom of the Lake, memory awoke associations which led me to exclaim: "Why, here is a bit of the Trossachs, and there" (as we skirted a beautiful islet, seven acres in area) "is Ellen's Isle!" Mr. Gibson replied "That is just what Mr. John Ferguson said, when he visited the Lake;" and then our good friend expatiated on the delight which Sir William Gregory expressed with the Lake and its framework of jungle clothed hills. Sir William having cultivated a special taste for the beautiful, his judgment is of special value. He has seen all that Italy has to show, including what no one who has seen it can ever forget, the scene from Fiesole, outside Florence, bathed in the glories of a summer sunset; but when I once ventured the opinion that we had scenery and sky effects in the mountains of Ceylon, which compared favourably with the beauties even of Italy, his response was: "Compare with Italy! Why, Ceylon has a beauty of its own with which that of Italy cannot be compared Even in climate portions of Ceylon far surpass Italy." That was the testimony of a competent authority who had travelled extensively and observed keenly, with an eye open to the beautiful in nature, and I can fancy the author of "Lake Gregory" finding consolation in the fact that in the exquisitely lovely solitudes which surround the mountain mere of Labugama, no exigencies of a racecourse, as at Nuwara Eliya, will intervene, to convert what might have been a full and beautiful body of water into what is largely a series of ugly marshes. But lest I should further mar the tranquilizing and peaceful influences of the silent and solemn beauty which reigns over the waters of Labugama and the hills and forests which guard it and are mirrored in its bosom let me here make another pause. I cannot help recalling the terms of an epitaph I saw in Northern India: "Be still: she sleeps!" The being who sleeps in this case is the spirit-creation of a poet, who described her as

——————"Lady of the Mere,
Lone sitting by the shores of old Romance."

The circumstances and surroundings of the Colombo Water Supply Reservoir at Labugama, are of a specially favourable nature. The catchment area of nearly 2,400 acres is covered with dense jungle or forest and the streams which flow into the Lake from hills varying in height from 500 to 1,500 feet above sea-level, run over boulder beds, so that the very minimum of earthy matter is carried into the reservoir, while twigs and branches are intercepted at the mouths of the Wakoya and the minor streams. The sluice arrangements, too, for letting out, at the bottom of the reservoir, flood waters and such solid matters as may have subsided, are very efficient, and Mr. Burnett pointed out, in his final and most able report, how they could be made still more so. The usual depth of water at the bund end of the Lake is 60 feet, and Colombo is supplied from the top portion, not lower down than 36 feet in any case and as a general rule from not more than 12 feet below the surface. Added to this condition in favour of the purity of the water, it is passed slowly twice through 560 feet of copper gauze strainers of 900 meshes to the square inch. With such precautions and the keeping a margin of from 30 to 50 feet round the Lake free of forest so that a grass sward forms over it, there is no occasion for filtering beds at Labugama. Indeed Mr. Burnett showed, that, with doubled sluices and other expedients, the enormous quantities of flood and waste water which are now discharged into

the bed of the stream could be utilized as a further supply for Colombo. And, although, by the help of the service tank, with a capacity of 8,500,000 gallons at Colombo, three millions of gallons are now supplied instead of the two millions originally estimated, it seems probable that, looking at the rate at which the population is increasing, (2 per cent per aonum at least,) the duplicating of the existing 20 inch pipe may, ere long, become necessary. It is just possible that Negombo, which is now dependent on wells at a considerable distance from the town, might, in addition to Colombo, be supplied from a second pipe? Mr. Burnett expressed the hope that the forest over the catchment area, in which there are no abodes save those we have mentioned and no cultivation of the soil, should be preserved in perpetuity. But as the larger timber trees within the reserve come to maturity, there is no reason we can see why they should not be dealt with by the Forest Department, the vacancies being filled up by planting seedlings or by natural reproduction. Meantime it would seem that there is scope for the planting of handsome and useful trees round the Lake, outside the grass margin, of course. The springing up from the waters, too, of a few of our indigenous freshwater fishes, during our visit, suggested the idea that here are most favourable conditions for breeding the gourami of Mauritius, the large golden carp of Java, and the best fishes of Southern India as described by Mr. Thomas. Apart from the economic value of the fish, we suppose their presence would tend to purify the water of the organic matter on which the fishes would feed. We need not tell our readers how greatly the margin of greensward adds to the beauty of the Lake, while the numerous boulders which are scattered over the surface of this margin give a fresh picturesqueness to the scene. At one place on the shore of the Lake, not far from the remains of the cocoanut tope which the elephants made short work of when the human owners of the palms had been removed, there is further evidence of former life and action, in the shape of mounds of earth thrown out in digging a plumbago pit. The construction of the bund was a work of no slight difficulty from the depth which had to be reached before solid rock without fissures was found. The length of the embankment at the top is 120 yards ; the length of the foundation trench 160 yards ; the greatest height of the embankment 72 feet ; the greatest depth of the foundation trench 72 feet, and the greatest height from the bottom of the foundation trench to the top of the embankment 109 feet. The contrast of the bright green of the grass on the long outside slope of the bund and the dark weathered appearance of the blocks of gneiss of which the facing wall is composed and also the fragments blasted out of the spillwater channel, is very striking. Equally striking was the contrast between the surrounding expanses of wild jungle and the roses, hibiscus plants, bougainvilleas, crotons and other shrubs, which Mr. Gibson has succeeded in growing around his and his family's ruly solitary abode. The owner of a tea plantaion at least two miles distant talks of the Water Works Engineer as his "neighbour, next door." We were glad to find that the family had not suffered from fever, the Engineer himself being a picture of robust health, notwithstanding the performance of duties which involve constant exposure to the weather, by night as well as by day.—The total capacity of the reservoir (176 acres area, and 360 feet above sea level, or 260 feet above the level of the water in the service tank on the summit of Maligakanda at Colombo) is no less than 1,373,000,000 of gallons, equal to 25½ inches depth of rain on the drainage. As we have already stated, the Colombo supply is drawn at depths below the surface of 12, 24 or 36 feet, and the capacity to the lowest level of supply is 1,233,000,000 gallons, equal to 6,000,000 gallons for 200 days. It will thus be seen that if no serious accident happens to the great pipe, against which all possible precautions are taken, there is no fear of the continuance of an ample flow of water to Colombo. The main pipe is 25 miles and 5?2 yards in length from the straining well at the outlet towers in the Labugama Lake to the Maligakande reservoir at Colombo. I now again quote some interesting details from Mr. Burnett's report:—

The top level of Labugama reservoir is 360 ft., and the water-level in the gauging tank is 102 ft. above sea; the fall is therefore 258 ft., giving a head or loss for friction of 10⅓ ft. per mile. The pipe thus delivers 3 000,000 gallons in 24 hours as measured into the Service reservoir.

The level of the pipe where it leaves the straining tanks at Labugama is 303½ ft. above sea. In three miles from Labugama it falls 233½ ft. to the level of 70 feet. In three miles further it falls to the level of 30 feet, and crosses the Hanwella flat, 19 miles from Colombo, at the height of only 20 to 25 ft. above sea level. For 16 miles out of the remaining length the level of the pipe varies from 5, 10, and 15 to 20 and 25 feet above sea level, rising at intervals for short distances to 30, 60, and 70 ft. For 19 miles the pipe is thus subject to a pressure of 300 to 355 ft., or about 130 to 150 lb. per square inch when a valve is closed. Great care is therefore required in working the valves to prevent shock on the pipe, which would lead to certain breakage, and special valves are placed every half mile or so for this purpose, so that every half mile length can be isolated for repairs when required—even then, special care and training is necessary to avoid danger in dealing with the heavy pressure on the long length of pipe.

The extremely flat contour of the section for long lengths required special arrangements in creating artificial summits for the escape of the air disengaged from the water in motion, with the necessary air escape valves, in order to prevent the flow of water being reduced or stopped from the pipe becoming charged with air. These air valves are often required in duplicate, and are placed from one-eighth to one-fourth mile apart where artificial summits were made, and on every natural summit along the line of section. Cleansing valves have been placed at every depression or hollow for scouring and emptying the pipe. Altogether there are on the main pipe 48 special stop valves, 20 in. diameter ; 44 special stop valves, 8 in. diameter ; 61 cleansing valves, 6 in. diameter ; 106 air valves with stop valves, 4 in. diameter. These all require inspection, cleaning, oiling, and other attention from time to time to maintain them in good working order.

The main pipe is laid either in or alongside the public road from Colombo to Hanwella. For this distance the country is subject to floods two or three times a year, for several days together, and these floods rise to a maximum, as in 1872 and 1883, of 12 and 17 ft. respectively, above the road and pipe.

The road is in many places embanked, and generally the permanent water-level of the country is only about 4 to 5 ft., even in the driest times, below the surface. It therefore was necessary to keep the main pipe above the permanent water-level and as high as possible in crossing streams in reference to the flood and to the free drainage and escape of water from the land. This necessity required numerous and wide openings over drainage outlets and streams. There are thus 56 crossings in all ; of these, 42 vary from 6 to 24 ft. openings and 14 vary from 48 to 196 ft. in length.

The foundations of these bridges are below the ordinary water-level, and 60 of the piers are founded below sea and permanent water-level. The ground consists of beds of sand, gravel, clay, and peat and soft deposit, alternating, and to avoid deep foundation, such as iron cylinders, the piers were made solid blocks of brickwork with as wide a base as possible, so that they could be

forced down by weighting to a bearing should any settlement take place. In only five instances has this occurred, and has thus been met without risk and in only one instance with stoppage to the supply by he main pipe. All are now sound.

The two highest localities in the town were Elie House, where the ground is 100 ft. above the sea, and Maligakanda, where the top of tho hill was 70 to 5 ft. above the sea. It was therefore impossible to obtain the usual working pressure for the town d stribution piping of 150 to 200 ft., and this was therofore reducod to the lowest safe working limit of only 10 ft. per mile of distribution.

The Elie House site had the advantage of 25 ft. greater elevation, but to deliver the water from Labugama there, instead of Maligakanda, added about a mile in length to the main pipe, while after being brought there the greater bulk of all tho water had to be conveyed back again about three miles to the middle of the town, whereas at Maligakanda it was ready to hand. Besides the additional cost of these four miles of large piping ab out R200,000, the greater distance the water had to be conveyed from Elie House required 30 feet higher elevation in a reservoir there than at Maligakanda to give the same general pressure over the town.

The water had to be delivered, at such times as the full demand exists, at the levels equivalent to 80 ft. in the Fort and Wolfendahl, 70 ft. at Fishers' Hill, and at least 40 ft. at Pashetal in the north and Wellawatta in the south. These requirements have been since proved correct by the frequent complaints of want of water and want of pressure previous to the recent completion and use of the service reservoir, and created the necessity of raising the service reservoir to give the level of 100 ft. to the water at Maligakanda or 130 ft. at Elie House; in either case an elevation of 30 ft. above the around level.

The cost of the reservoir would therefore be the same at either place, and the Maligakanda site was adopted, as it saved the four miles of large pipes and gave a much more convenient centre for working the distribution. As it is, the northern main from the reservoir is five and a half miles long and the southern pipe four miles.

By the original design this reservoir was excavated from 10 to 15 ft. into the ground, and the water level was raised 30 feet above the surface with massive walls of cement concrete. The top was covered with a double ventilating roof of thin concrete arches, and the floor was also lined with 12 in. of cement concrete. The concrete for the whole of the work was put liquid into the site, the walls being faced with 10-in. concrete blocks on both sides. The inside dimensions of the work were 190 ft. and 191 ft. 4 in.; depth of water, 40 ft.; the height of the walls from foundation to top of parapet, at upper roof, 49 ft.; and thickness of walls varying from 5 ft. 9 in. at top water level to 19 ft. 9 in at the bottom, the r of parapet being from 3 to 2 ft. thick. The water capacity of the reservoir was to be 8,500,000 gallons.

Then follows the history of the service reservoir, until the addition of an earthen embankment and division into sections preserved the concrete wall from expansion and contraction, from changes of temperature so great occasionally, we believe, as a difference of some 70° in the 24 hours, while percolation through the cement and concrete which Mr. Burnett, (mistakenly, we believe) held to be impervious, was prevented by an internal skin of waterproof and elastic asphalte. Our readers will be interested to learn that the weight of the masonry of the Maligakanda reservoir is no less than 40,000 tons; of the earthwork 39 000 tons; of the water 38,000, or 117,000 tons in all, resting on the laterite foundation. The total length of piping of all sizes is no less than 85¼ miles; public stand pipes in Colombo 664; houses with separate services laid 1,414; trade supplies 30; garden supplies 43. As regards separate services for houses, it must not be forgotten that in many cases there are excellent wells attached to a good many houses, such as those on the sea-side of the road at Kollupitiya. Brackets, as recommended by Mr. Burnett, are now being attached to some of the standpipes, and it is to be hoped that the present reckless waste of water at these standpipes where many of the people bathe as well as draw water in a most careless manner, may be checked, if not entirely prevented. The consumption of water per head of the population at present averages 19 gallons per head per diem. The use of the service reservoir, containing 8,350,000 gallons, with a depth of 39 feet, the inside dimensions being 190 feet by 191 feet 4 inches, has added 40 per cent. to the water available by day to the town, with an increase of 40 feet pressure. If roads are to be thoroughly watered, drains properly flushed, public baths provided, and the Colombo Lake kept full of water, even when evaporation takes away half an inch per diem from its surface, a new pipe from Labugama to Colombo must soon be laid. The difficulty is that already, in consequence of the necessity of meeting interest and sinking fund for the repayment of the portion of Water Works Loans allotted to the Municipality, the assessment of property in the town has reached 11 per cent. on the annual value. But with its grand harbour and other advantages, the population of our chief city is rapidly increasing, and wealth and the value of urban property must increase in proportion. The cost of bringing pure mountain water from the beautiful Labugama Lake within reach of the inhabitants of Colombo has been not far short of £350,000. But even so, the cost is comparatively moderate and the boon in a sanitary and general sense is really priceless. The cost for each gallon of water sold in Colombo, before the Waterworks came into play, was 1 cent; it is now the merest fraction of a fraction of a cent. For a consumption of 19 gallons per diem, or about 7,000 gallons per annum, per head of the population the average cost per annum for each person is only 65 cents, the water being as pure as any in the world; while the supply in olden days was frequently brackish, unwholesome and insufficient. Let the inhabitants of Colombo, therefore, while grateful for the benefits of one of the best water supplies in the world, remember with respect the name of the engineer who, bearing up bravely against anxiety, obloquy and the inroads of fatal disease, just survived to see the great work he had initiated and carried on to a successful conclusion, so thorough a success as it now is. A memorial stone in honour of Mr. Burnett ought to be erected on the bund of the beautiful Lake of pure mountain water at Labugama.

Before saying farewell to the lovely Lake of Labugama, and its romantic surroundings of hill and forest and greensward I must refer to a few unextended notes. The elephants, besides levelling a score of coconut palms on the border of the Lake, which belonged to the submerged village, also killed a caju tree by denuding it of bark. Recalling reminiscences of "The Lady of the Lake," we asked Mr. Gibson if he had ever seen deer take to the water at Labugama. The answer was in the affirmative: sambur and red deer and that exquisitely formed miniature deer, the meminna, had all been observed swimming. With reference to the climate and soil, too we were told of a rain storm of 9½ inches in 4 hours, which had produced no appreciable wash.

Having thus noticed the main incidents of our pleasant trip to the Labugama lake and some of the main facts connected with the transmission to and distribution in Colombo, of its waters, by gravitation (we were told of a pressure of 107 lb. to the square inch?), we reserve for a final

notice the record of our boating trip down the Kelani river to the Bridge of Boats.

Before we start downwards from Hanwella, on our nicely platformed double-canoe, comfortably roofed, and prettily ornamented with the tender leaves of the coconut palm, with bunches of king coconuts and strings of kitul seeds, another of our party will recall some reminiscences of what was long the border post between the maritime possessions of successive European powers and the mountain kingdom of Kandy:—

"Hanwella is not, so far as I know, mentioned by the Portuguese writers; but they and the Dutch refer to the place under its alternative name of 'Gurubewula' (? 'the great hilly eminence'), which is spelt 'Grubsbe' in Ribeiro's map; 'Grouabely' in the map in Spilbergen; 'Grouably' in De l'Isle's map in Le Grand; 'Gourbevile,' 'Goerbevele' and 'Goerbeville' in Valentyn; 'Orwevel' by Daalmans; and 'Horrenwebel' by Herport. The name 'Hanwella' does not undergo such transformations, the worst one being 'Anguellen' in Daalmans. The fullest description of Hanwella in the Dutch period is given by Heydt, who accompanies his description with views of the fort from the east and the west (drawn in 1736) and a ground-plan. The fort was built of squared-stones, and had two whole bastions facing landwards, two half-bastions facing east and west, and a horseshoe facing the river, while round it was a dry ditch. It was capable of mounting 32 cannon, but only half that number were actually mounted. The garrison consisted of only 30 to 50 men, who were sufficient, says Heydt, to withstand 50,000 or 60,000 natives, as the latter possessed no large field artillery. The fort was intended to guard the high road between Colombo and the Kandyan frontier, and also the waterway of the river. Inside the fort in Heydt's time were a number of fine tamarind trees. The gateway was in the eastern side of the horseshoe. By the horseshoe on the edge of the river bank was a little summer-house. On the south western bastion was a belfry. The officer in command did not reside inside the fort but in a house outside. While Malwana was to the Portuguese a pleasure retreat and sanatorium, to the Dutch Hanwella was a place of punishment for mutinous and disorderly soldiers, and was considered a penal settlement. A Europsan student who was amongst those sent to this place left his opinion of it in some lines which Heydt quotes as follows:—

Is dit het Schoene Land? leit Adam hier begraven?
Is dit het Paradeys vaen Gottes Hand geplant?
Kan hier ein ehrlyk Mensch syn Dorst nog Hoenger laaven,
En leven nog in vveld? 't gaat boven myn Verstand.
En Patt- en Schlangen-Nest, voll Berg en tiepe Daalen,
Blud-Suygers sonder Taal en Schagers die het Geld
Uyt Sacck en Beürsen haalen, en wat nog hier is all
Soot men ook vvilt betaalen, Kreigt mens maar bey Gefall.
Is dit het Paradeys, soo ists van Gott vervlookt,
Die meent verloost te syn, der Beed, Vast, en versookt.

This may be freely translated as follows:—

Is this the lovely land? does Adam's corse here buried lie?
Is this the Paradise of old planted by God's own hand,
Can any honest man his thirst or hunger satisfy,
And yet remain in health? That 's more than I can understand.
A nest of toads and snakes, and filled with hills and valleys deep,
Bloodsuckers numberless, and taverners who filch the coin
From out one's purse; and what one here considers all in all,
I speak the truth, one only gets as chance may so befall.
Is this the Paradise, then 't is by God accurst, I say,
Who wishes to be freed therefrom must fast, beseech, and pray."

Taking early tea before we started from Hanwella, we carried our breakfast with us in the boat, the *al fresco* meal being enjoyable, after we had feasted our eyes and hearts on the beauties of the river which has its origin on the Adam's Peak ranges, and which along its whole course is bordered with varied and luxuriant verdure. The morning air was deliciously cool and as the sun became powerful; the heat was tempered by the north-east breezes, except on the few occasions when sharp bends in the course of the river placed masses of trees in front of us which interrupted the movement of the wind. The succession of long reaches, curves and frequent sandbanks gave interest to the early portion of our journey, and from first to last the river banks were densely lined with indigenous trees and coconut palms, if the distinction is permissible. Prominent as an edging to the water was *Hibiscus tiliaceus* with its large heart-shaped leaves and yellow blossoms, the latter closely resembling those of the *suriya* (*Thespesia populnea*), with *pandanus*, large lilies, and numerous flowering creepers. We were interested in identifying (occasionally appealing to the boatmen for native names) the various trees on the banks, amongst which the rich purple-red foliage of the *hal* was striking, as well as the scarlet tints of the leaves of *Lagerstrœmia regina*, the splendid flowers of this tree having given place to seed spikes. But next to the bending coconut palms, the prevalent vegetation was that of the graceful yellow stemmed feathery bambu, a plant which combines utility with beauty in an eminent degree. The framework of rafts is generally composed of bambus, and we saw some of these putting forth young shoots as they floated on the water. At night the bambus are the favourite haunts of thousands of fireflies which at intervals, as if by intelligent direction or arrangement, hide and then flash out their brilliant phosphorescent light amidst the branches. Generally the bambus were in detached clumps, but occasionally they were in long rows, forming a series of the most exquisite gothic arches, as the bending branches of separate groups met above and crossed against the sky. Occasionally, at the multitudinous ferries and bathing places, we got a glimpse inland, the expanse of an emerald green rice field relieving the monotony of the luxuriant tree vegetation. Scenes of ferrying, navigating by boats and rafts, fishing and bathing, with the flights of kingfishers, water-hens, and sandpipers imparted life to the river. But the very richness of tropical vegetation has its disadvantages, as from a river such as the Kelani, we see but little of what makes a voyage up the Rhine, for instance, so interesting: towns and ruins, vineyards and orchards. Successive landings would be necessary, even to see spots with which interesting associations are connected: Kelani Buddhist temple for instance, the history of which, as a site at any rate, is said to go back some twenty centuries or more With a strange idea of morality, an ancient legend records that, as retribution, not for the sin of a Buddhist priest who was discovered in an intrigue with the Queen, but that of the monarch in putting the "holy" man to death, the waves of the sea encroached on the land until 640 villages (470 of which were principally inhabited by divers for pearls) were overwhelmed, the distance between Kelani and

the sea-coast being reduced by about 25 miles. The probability seems to be that some geological catastrophe is shadowed forth in the legend. At present the belief is that Ceylon is gradually being upraised in about the proportion that the mountain tops are lowered by disintegration from tropical heat and rainfall. One of the associations connected with the Kelani is that Bhuwaneka Bahu VII., King of Cotta, who about the middle of the sixteenth century allied himself with the Portuguese, was accidentally shot by a gentleman of that nation on the banks of the river. Half a century ago the Kelani Valley in the neighbourhood of Hanwella was a favourite resort of elephant hunters, and I have a vivid recollection of poor young Wallett, of the Roads Department, son of Major Wallett, being killed by one of those animals, and the immediate vengeance taken, at considerable risk to their own lives, by Capt. Payne Galway and other friends of the victim.

But the main object of our trip down the river was to visit MALWANA, the very name of which is redolent of flowers and sweetness. We were subsequently glad that the boatmen, instead of landing us n the mouth of the fosse (the *wana*, or artificial water channel) of the ancient fort, took us further down. We were thus compelled to make a long circuit, through villages, bazaars and fields, which gave us new impressions of what purely native life and conditions are. We did not traverse roads other than the native paths which, in all probability, are unaltered, save in being worn by the feet of succeeding generations, since the days when the Lusitanian Doms had here their palatial country residences, in connection with the fort on the river bank, the contour of which we were able to trace amidst the jungle which has overgrown alike moats and walls and what looked like a corner battery. looking up the river. Proceeding along the jungle paths we were surprised to find that they led us into quite a populous village with a well supplied and lively bazaar. Two well-built mosques and the appearance of well-to-do "Moormen" in the bazaars showed the predominance of the Muhammadan element in this busy and beautiful place. Amongst our party was the author of "Iṅgē Vā;" and by the medium of a peculiar dialect of Tamil, sometimes hard to understand, a leading Moorman boutique-keeper gave us, through our companion of Dravidian tongue tendencies, a good deal of information as to the site and traditions of Malwana. "It has that name," he said, "but the people now all call it Wélgama." In taking a circuit to the fort we passed through exceedingly fertile, rich-soiled fields of grass, and grain, with patches of vegetables and groves of fruit trees. The crossing of the Malwana-ela by trees laid from side to side with a very shaky bambu hand-rail tried the nerves of some of us; but when an hour and a half had been spent in interesting explorations, we all felt that we should not have missed this glimpse into rural and village life on the banks of the "Pleasant" river and so near Colombo, on any account. And this although no inscriptions, ancient or modern, rewarded our search. We heard of and examined fine slabs of stone in the verandah of a mosque and that of a superior Moorish house, but there was no vestige of lettering on them, and they had been taken not from the European fort we had come to see, but from the more conspicuous ruins of a native one on a height lower down, the river of the existence of which we had no previous idea. An intelligent Moorman, who acted as our guide, told us it was known as "HADI-DAMALA," and that tradition connected it with a Tamil Rajah who once reigned here, It is surely curious that the Portuguese and Dutch writers who have described Malwana take no notice of the more ancient fort which probably was fairly intact in the Portuguese period. If any reader is in possession of information regarding the alleged Tamil fort or can point us to any references to it in the literature of Ceylon, we shall feel indebted for the courtesy. Near the Tamil fort and the Moorish residence already referred to, were some evidently very aged trees, jaks and bilimbis especially,—of unusual size and gnarled to a degree. There was one lady in our party, and she was invited into the Muhammadan abode, placed on a chair and intently stared at by the women and children, the one disappointment being that she could not speak Tamil. Before leaving this interesting place we ascended a great boulder which juts out into the river and commands an extensive view, including the vast sandbank already mentioned as lying in the Kelani, between Kaduwela and Malwana. The historical references to this fertile and really beautiful place we leave our companion who is specially well read in such lore to summarize:—

"Malwana was chosen by the Portuguese more as a country-seat for the Governors of Colombo and a sanatorium for the troops than as a military post. Sá e Menezes says:—

'The Governors held their court in Malmuana [Malvana], three leagues from Columbo, in sumptuous Palaces, which they called Rosapani: here three times in each year came to visit them the principal Zingalas of the Island, who brought with them large presents, as a sign of their friendship and allegiance.'

Ribeiro says:—

Malvana, was situated on the bank of the river, about three leagues from Colombo; moreover, it covers a small area with a square redoubt, without any flank. In it resided a Captain, Ensign and Sergeant, and the soldiers who went there from the hospital became convalescent and returned to their camps. It had a church, a chaplain, a storehouse for provision and ammunition.,

To this Le Grand adds:—

'Malwana never was reckoned a fortress; it is only a country seat at which the Captains-General usually resided: they had a handsome palace there called *Rosa-pani*; and as the air was believed to be purer there than anywhere else in the whole land, those who were convalescent were sent there to recover their strength.'

The Captain-General of Colombo, according to Ribeiro, assumed the title of 'King of Malwana.' In the curious map in Spilbergen is entered 'Malleuano,' and in the itinerary in the same work the name is given as 'Malevano.' Baldæus does not mention Malwana; but he gives the place in his map, which also has 'Iassepane.' Heydt in his map of the Colombo disawani gives 'Maluvane' as a fort, but puts 'Rassepanne' a long way off westwards. Fraser's great map gives 'Rassapane' a little north-east of Malwana. The Portuguese 'palaces' seem to have disappeared soon after the Dutch conquest; for when Dr. Daalmans (who calls the place 'Malluanen') accompanied Governor Pijl thither in 1687 they were entertained in a hut covered with white cloth. "In 1736 a detachment of troops, 82 strong, sent by the Dutch to put down a revolt among the Chaliyas of the Siyane Korale, was driven from Attanagalla by a large body of lowcountry Sinhalese and Kandyans, with a loss of two field-pieces beside ammunition and baggage, and forced to retire to Malwana. The small fort that had been thrown up here was, however, attacked by the Disawa of the Four and Seven Korales at the head of some thousands of men, and was utterly demolished, the guard of lascoreens perishing in the flames. This

act gave rise to a formal war between the Dutch and the Kandyans. In 1881, when the last census was taken, Malwana contained 63 houses and 342 persons. Rasapane does not now exist, apparently: at least it is not mentioned in the last census report. The name may mean 'sweet drink,' 'sweet plain,' or 'rose plain.'

By the time we had again embarked after our visit to the melifluous named Malwana, we were quite ready for breakfast, of which we partook as we glided gradually into deeper and broader water. It was a pleasant incident in our voyage that soon after we came in sight of the grand railway lattice bridge, the 2 o'clock train from Colombo to Kandy rattled over it. I was reminded of the period, now a quarter of century ago, when the first train (a holiday trial one) which crossed the original bridge was seen by me, also from the river. How much has railway communication done since then for the island, which water carriage and road traffic could never have accomplished, in furthering the progress of prosperity and enabling the country to bear and overcome adversity.

P. S.—I find still one note of information obtained at Labugama unused. Mr. Gibson told us that on occasions of the annual, or rather periodical, migration of butterflies, he has seen the lake surface perfectly white with the moving masses of insects, while a number of "large swallows" were actively preying on them. The butterfly-eating bird was probably the alpine swift, *Cypselus melba*; or perhaps the Indian swift, *Cypselus affinis*, the *Wæhælaniya* of the Sinhalese.

Here ends the record of our pleasant and interesting "Holiday Trip to Labugama Lake" and the return voyage down the Kelani from Hanwella to Malwana, and finally to the Bridge of Boats, the recollections of which vie in interest with what poetry has imagined in descriptions of Fairy Land. The Dutch student who scoffed at the earthly Paradise on the banks of the Kelani was a miserable misanthrope!

A NEW SOURCE OF VANILLA.

Vanillin is the odoriferous principle of vanilla, which from a previous paper our readers know to be the fruit of a plant called *Vanilla aromatica*. Vanillin exists in the vanilla pod to the extent of about 2 per cent. These pods used to be very expensive, but new sources of vanillin are being discovered, and it seems likely that the vanilla industry will soon be extinct. Vanillin, which is the only substance for which the vanilla pod is valuable, has been found in asparagus, raw beet sugar, and assafœtida; it likewise results from the oxidation of olive wood. On a large scale it is prepared from coniferin, a compound which occurs in the sap of the cambium of pine-trees. The latest source of vanillin has been discovered by Herr Schneegans in the seeds of *Rosa canina*. These are extracted with ether: part of the ether is separated by distillation, and the residue is agitated with sodium bisulphite solution saturated with sulphurous anhydride. Dilute sulphuric acid is then added, and finally, after much washing and drying, a brown oil is obtained, which in a few days becomes a mass of crystals. Possibly the vanilla pod will find a new commercial rival in these *Rosa canina* seeds. —*Grocer*.

CABBAGE FOR EVER.

The London *Daily News* has the following amusing skit at the expense of the vegetarians:—

The Vegetarian Congress has dispersed to the four winds of heaven, leaving upon the minds of some who take life seriously a sense of humiliation. All the other Congresses have left behind them a pleasant impression, for they have given the race some ground for hope that it is getting on somehow—making, in spite of all its blunders, for righteousness. But if we are to believe the Vegetarian Congress, we have not yet learned how to live. It makes short work even of the last shred of definition of himself to which man has clung—an animal that cooks its food. He cooks, certainly, but it is not food. Four or five millenniums have passed since the pyramid of Cheops first looked down on the Nile, and the Neanderthal man became dust myriads of years ago, and yet we do not know what is good for breakfast. Instead of doing our best to unravel that problem, we have been frying one another about theological propositions. When the great problem is at length started, we find that the new doctors of the law differ as widely concerning our perishable bodies as the old doctors concerning our immortal souls. "What the Vegetarians want is to know what the right and proper foods are." Such is the surprisingly innocent, naïve observation made at the Congress by a vegetarian of the Nut-Eating Sect, Mr. Manning. In course of time there will be as many rival sects of Vegetarians as there are rival sects of theologians. Here are the Nut-Eaters, with Dr. Densmore at their head, proclaiming that grain food is as perilous to the body as beef and mutton. Starch is the heretical element, so to speak, in grain food. But then comes Miss May Yates, an ornament of Vegetarian Orthodoxy, and Miss Yates announces that outside whole meal there is no salvation. These are the two Schools, or Churches of the Vegetarian faith—the nut-eaters and the grain-eaters. But there are minor denominations, which borrow from either side the doctrines that seem to them most reasonable. There is even a mystic sect in process of evolution. Thus Mr. Jeffreys described, amidst rapt silence, to his audience in the Memorial Hall, how when he wanted his thoughts to concentrate themselves upon the physical world he "took cereals," but "fruit" when he communed with the unseen. The President, Mr. A. F. Hills, is an out-and-out Mystic; "pulse," quoth he, for muscle; "cereals" for brain, "fruit" for the soul, and nuts for the mighty spirit of man. Dr. Densmore however nearly concedes the anti-vegetarian doctrine when he permits a diet of "eggs, milk, or cheese." If these be not animal substances what are they? The English have conquered the world on beef and bitter beer. Perhaps they might have done it as well on pulse. We cannot tell; but we do know what they have done on the other diet. Then there is this disquieting thought: At the British Association, Mr. Ravenstein argued that in two centuries the earth would be full; but that is not the question at issue—what we want to know is how the supply of nuts can be kept up for the consumption of this rapidly increasing human race. The practical conclusion is, that while the Vegetarians are trying to agree among themselves, we had better go on with our beef and mutton—but in moderation. The solid basis of truth in the Vegetarian doctrine—which we are glad to say is doing immense good in the world—is that English people eat far more flesh meat than is good for them.

RUSSIA AS AN OUTLET FOR INDIAN TEA.

To the Editor of the HOME AND COLONIAL MAIL.

SIR,—In the letter which you kindly inserted in your issue of Oct. 24th I promised to return to this rather interesting subject.

Since that date our Ceylon competitors—always in the forefront of the battle—have clenched the matter, and sent out Mr. Rogivue (whom I alluded to in my previous letter, and who has since been over here to report progress) to commence a campaign in Russia. They have liberally subventioned him, and invited him—if he should find more money necessary, in order successfully to prosecute the enterprise—to apply to them again later on, and that he need not fear lack of support.

I had intended suggesting co-operation on the part of the Indian planting community with Mr. Rogivue's

enterpriso, with a view to bringing more money to bear upon what will undoubtedly be an uphill and costly game. From enquiries, however, which I made, both of Mr. Rogivue himself and of other Ceylon men, I found that such co-operation would not be very easily arranged.

Meantime, it cannot but be that the Ceylon Planters' action will "break the ice" for their Indian "brethren" as well as for themselves, and that the introduction of *Ceylon* tea into Russia, if successful, will be but a stepping-stone for *Indian* to follow on.

Now, at the first blush, it will no doubt occur to your readers—especially to your planting readers in the distant jungles—that the Indian industry should at once raise a fund and proceed to follow in the lines of the Ceylon men. I do *not* however, meantime, advocate such a step, for reasons which I will endeavour to state as briefly as I am able.

1. Owing to the action already taken by Ceylon (which will break down the Russian prejudice in favour of China teas), it is less necessary now that India should act than it was.

2. In view of the recent heavy calls made upon the Indian community (1) in starting the New York scheme (*The Associated Planters, Limited*) and (2) in introducing Indian tea into France, both at the Paris Exhibition and subsequently, I fear that it would bo oxtremely difficult to induce our *tea circle, for the present* at least, again to subscribe money for this purpose.

3. For reasons which will be obvious for those of your readers who are intimately acquainted with the inner workings of the wholesale (especially the export) distributive and dealing trads, I have, after a good deal of reflection, come to the conclusion that it is inexpedient to take, hastily, any action which might tend to interfere aggressively with the operations of the large export tea houses, especially those carrying on business between London and Moscow, and that it would be better at first to endeavour rather to gain their co-operation and good-will, so that our teas may be brought a little more prominently than hitherto before the Russian consumere.

As already indicated, almost all the conditions are, comparatively speaking, in our favour, and "time" also "is on our side," hence there is no need for any hasty, and possibly ill-considered, action.

Two things, however, I would suggest :—

1. That steps be taken by the growers, either through the Tea Association or by means of a committee, to get into communication with the principal Russian tea merchants in London, with a view to ascertaining if any special steps can be suggested for facilitating the introduction of our tea into Russia.

2. That growers, either by means of written communication or by a personal deputation, approach the Russian Government either through our Foreign Office or otherwise, with a view to pressing the Russian finance authorities—*in the interests alike of the Russian people, and of the revenue,* to consider the expediency of a reduction in the heavy duty now levied on all sea borne tea, whether imported from or through Odessa.

There is every reason to believe that such representations, if properly put forward, would receive fair consideration from the Czar, at any rate, since the well-being of the people (closely connected with which is the supply of cheap necessaries of life) is supposed to occupy his mind especially at this time, and seeing also that the Russian Empire is not itself a tea-producing country.

Apologising again for the length of my letter, but trusting, however, that it may be the means of directing attention to the important question of opening up an Indian tea trade in a tea-drinking country of 100,000,000 inhabitants. I am, &c., G. SETON.

14, St. Mary Axe, Dec. 17th.

DURING their visit to Assam the locusts did not damage the tea when in hard leaf, but stripped a considerable amount of young tea a year old.—*M. Mail,* Jan. 7th.

THE DIVIDENDS OF INDIAN TEA COMPANIES.

About this time of the year the directors of the many Indian Tea Companies announce the ad interim dividends that they may feel justified in declaring. Although, of course, such announcements do not furnish sufficient data to estimate the results of the year's working, they must be accepted as supplying no slight indication of the prospects which the directors consider to lie before them. Accordingly we may fairly deduce from the statements published, so far as we have seen them in the English papers, the conclusion that no very promising prospect is anticipated of the working of Indian tea gardens during the current year.

For we observe that the interim dividends declared by the directors of the several Companies—so far as they have yet been heard of—in no case exceed 3 per cent, the majority of instances notified not having passed the limit of 2½ per cent. We may fairly contrast such dividends with those which the majority of the Companies working tea estates in Ceylon have thought it justifiable to declare. The contrast is in nearly all cases very striking. We must, of course, exclude from such a comparison those among the Companies working in this island which—established as coffee growing Companies—have had forced upon them the conversion of the estates they were possessed of into tea gardens. In the case of these it was not to be expected that they would be able to compete in the matter of declared dividends with the Companies more lately formed which have taken over properties already well advanced with the growth of tea. It is only with these latter that a fair general comparison with the gardens of India can, as the rule, be instituted. For it must be recollected that no such hampering process of change in cultivation as we have above pointed out has ever been a necessity to the Indian tea planter. In this case he has either had fresh and unbroken soil to work upon, or he derives his profit from tea gardens of a mature age in a high degree of cultivation. If we go back some twenty-five years or so, before Ceylon had entered as a competitor in any degree with India in the production of tea, it will be found that at such a date tea-growing in India was among the most paying of the industries of that Empire. The cause of the falling-off in this respect at the present day is not far to seek. Indian tea at that time purchased in Calcutta was charged as high for the better sorts as 4s 6d per lb. ! We have only to contrast such a price with that obtainable now for the finer sorts of Ceylon tea, to see how injuriously the competition of recent years must have affected the profits of the Indian tea planter.

Had this competition been carried on under conditions in all respects similar to those which prevail in the tea-growing districts of India, Ceylon might not have been able to outstrip her neighbour as she has done ; but the circumstances of our supply of labour, of our excellent system of communication by rail, by road, by river and canal, with the short distance of most estates from the port of shipment, of our climate which permits of plucking throughout the year, and one or two other minor advantages, have aided us here most materially. Therefore it is that while we find tea cultivation in Assam and other Indian districts to be in the present day, in the case of many Companies, but a barely paying industry, the same cultivation in Ceylon, even at the low prices—relatively to those of a past era—now obtainable, is one of the most satisfactory of any taken up locally. Had we been able, now that our own planting pursuit has

passed the stage of initiatory effort and become a well-developed and settled industry, to obtain the prices which the planters of India secured but some twenty years back, the profits which could have been realized by us would have been simply enormous.

Turning from our English files, we find that the *Indian Planters' Gazette* contains tables showing the results of working, &c, for the whole season 1889, by which is meant up to end of June 1890, we suppose, of 26 Companies registered in London. These certainly shew a different result to our deduction from the interim dividends. The totals and averages are thus shewn:—

Capital paid up	£2,951,886
Total area of cultivation ...	64,953 acres
Do. mature do. ...	54,769 „
Proportion of young cultivation	15·68 per cent
Yield (total crop)—per mature acre	422 lb.
Outturn (*Account Sales weight*)	23,100,052 lb.
Loss iu Taring ...	[From nil to 2·37 per cent].
Capital value—per acre of total cultivation ...	£45 9s 0d per acre,

The largest total area of cultivation is 9,185 acres, of which 7,521 mature, in the case of the Assam Company. The highest yield per mature acre was 809 lb. in the case of the Dejoo Tea Company Limited; the lowest being 255. The results per lb. for the season are thus given:—

		s.	d.
Total cost *	average per lb.	0	8·42
Surplus Commission to managers	„ „	0	0·28
Do. Profit for shareholders	„ „	0	2·45
Gross proceeds	„ „	0	11·15
Shareholders' profit—per mature acre	...		£4 6s 1d
Do do per cent on total cost*	...		29·06
Do do do capital	...		8·53
Dividend paid do do do			*4=Nil; 22=8·83
Reserve Fund do do do			8=Nil; 18=9·69

* Old non-dividend paying Companies.

The highest shareholders' profit per mature acre was £13 12s 2d. Four Companies, as shewn above, gave no dividend; one gave 18 per cent; another 15; one 14; one 11¼; 7 gave 10; one 9; one 8; 6 gave 6; one 5½; one 5 and one 2½. Leaving out the 4 old Companies, the general result of an average dividend of 8·83 per cent seems good, but there must be a large number of indifferently paying Companies outside the list.

Of course in our review of the differing aspects in which the results to the tea cultivation of Ceylon and India may be considered, we must take largely into account the fact that in very many instances of exceptionally large dividends accruing to the pursuit of that cultivation locally, the lands on which it is so successfully carried on were obtained under conditions which caused them to have been parted with for what was but little more than a nominal consideration. The collapse of the coffee-planting enterprise forced numbers of estates into the market, so greatly reducing their then purchasing value. This enabled the fortunes of the present to be largely built up upon the ruin of the past. Cases of this kind have been much rarer in India, and it is largely because of this that we contend that it would be unfair to accept instances of exceptionally high dividends declared with respect to the Ceylon industry as the standard for comparison with those of the Indian Companies. But when every allowance is made for these and the other conditions that we have mentioned, it remains evident that tea planting in Ceylon has distanced in its remunerativeness that of the neighbouring continent. Much of our relative superiority as to this remunerativeness may be assigned to the qualities inherent in our teas, which the taste of the home consumer has appreciated, and our brother planters in India have to contend against this superiority as well the local advantages possessed by us which have enabled us to produce at a lower cost.

SALE OF FOREST LAND IN HEWAHETA.

The block of forest land which formed a part of the Mooloya Estate and was advertised for sale today by Messrs. J. Auwardt & Co. was purchased by Mr. J. G. Wardrop (for Mr. R. J. d'Esterre) for R7,200, or about R46 per acre for 157 acres.

SALE OF HYNDFORD TEA ESTATE.

The Hyndford property near Nawalapitiya including Wallukelle and extending over 730 acres of which 212 are planted with tea, has just been sold by Mr. Evan Byrde as Fiscal and has been purchased for Mr. David Reid (who had taken the place of Messrs. Dent Brothers as Secondary Mortgagee) for R32,755 which we presume is the amount of the primary claim held by Mr. James Robertson, P. W. D. The estate is to be carried on by the Ceylon Tea Plantations Co., the leaf being prepared at the Mariawatte Factory,—in the interests of Mr. Rossiter and others concerned. Hyndford ought to become a valuable property under regular, careful cultivation.

CACAO THIEVES IN MATALE.

THEFT OF CACAO FROM THE YATTAWATTE ESTATE.

Mr. J. R. Martin, superintendent of Yattawatte charged one Baronchi, a lowcountry Sinhalese man with the theft of a certain quantity of cacao—ripe and unripe fruits—of the Forastero and Caracas varieties. About the 30th December Mr. Martin was informed of a man with a bag of cacao seen going from the estate. He therefore desired the headman of that village to make search and also gave him five men to assist him. On the morning of the 31st the accused with the cacao was brought to him: the cacao was about 20 lb and valued at about ten rupees. Mr. Martin did not question the accused as to how he got the cacao, as he understood from the headman that he had told him before. Having received information that a large quantity of unripe cacao had been stripped from the trees in the cacao field nearest to the accused's village, Mr. Martin visited the spot and found that a large number of unripe pods had been picked recently, also a quantity of recently shelled pods. There are no bearing cacao trees in the vicinity except a few on an estate belonging to a Parsee gentleman. At the request of the korala the arachchi of Udasgiriya, the village in which the accused lived searched the house of the accused and found the, cacao seeds placed in a hollow scooped in a heap of paddy in the course of germination, and put them into a bag. The accused told the arachchi that he got the cacao from one Peris Appu of Moragolla. Peris Appu who was called as a witness said that he owned about three or four hundred cacao trees, and that he never sells the produce in the village but sends them to Matale or Aluwihara and that he never gave the accused cacao seeds or pods.

Mr. FRASER, the laird of Wariapola, was called by the Court and said that he had had experience of cacao in Matale district for sixteen years, and that having examined the cacao produced before the Court he found that most of them were immature and that over 75 per cent were unripe.

The accused stated that it was true that the cacao was in his house as he purchased it at different rates from different parties whose names he did not know,

The following is the judgment:—"I find the accused guilty under the section of the ordinance under which he is charged. His story of having purchased the cacao seeds from Peris Appu is obviously false. He made that statement to the arachchi in the hope that he may be able to get Peris Appu to support him in that statement. But Mr. Martin has forestalled him in this. Mr. Martin sent for Peris Appu and he appeared in Court today. He has given evidence which clearly shows that he never gave or sold any cacao to this accused. The only hope accused had of accounting for the unripe cacao in his possession was to have said that he got it from a man whose cultivator the accused was and who had some bearing cacao trees. He could fee upon no other, because there is, it appears, no person in Yattawatta or Udasgiriya who could give him any cacao, for that product has not been cultivated yet by the people of those villages. Finding however that Peris Appu would not give the evidence which the accused hoped he would give, the accused in his statement gives Peris Appu up and takes refuge under an alleged purchase from unknown sellers. Obviously therefore his defence was false, he knew it to be false. His conduct with reference to the cacao he had in possession strongly proves his guilt. He had concealed the cacao in the middle of a layer of paddy seeds which had been kept to germinate.

"Theft of cacao, just at this particular time, is a very predominant evil, and it is rarely that such thefts can be detected. The offence is committed under cover of night or at a time when the watchmen are not about. I have no doubt upon my mind of the guilt of the accused. I feel bound to do all I can to protect owners of estates from the depredations of village thieves who not only steal these garden products but do so in the very heartless way in which they set to work. The crop is not only stolen but the trees are ruined and hindered from bearing.

"I find the accused guilty and sentence him to be kept at rigorous imprisonment for a term of 6 months and to receive 15 lashes.

(Signed) J. H. EATON, P.M."

THEFT OF CACAO FROM WARIAPOLA ESTATE.

B. N. Abbas, conductor of Wariapola, charged one Letchimen of Elwala with the theft of five cacao pods, worth one rupee and twenty-five cents the produce of Wariapola estate, the property of Mr. R. S. Fraser. It appears that the accused was a paid-off cooly of the estate, and since he was paid off he has been living near Wariapola estate. On the 31st December he and another boy about 12 years old were seen near a jak tree on the estate. A watcher ran up to him and found five cacao pods in his possession; they were bundled in a cloth. He brought the cacao and both of them to the complainant. In defence the accused stated that he did not pluck the cacao pods, but plucked and ate jak fruits from the estate.

The judgment is as follows:—" It is quite clear that the accused did steal the five cacao pods he is charged with having stolen. His statement amounts to admission of a theft of jak fruits, but I think the evidence makes it clear he stole the cacao too. This is the fourth case of cacao-stealing that I have been trying today. As the season for cacao to ripen is setting in, the thieves who practically live by theft of agricultural products are seen moving about under cover of approaching darkness to enrich themselves at the expense of the proprietors of estates.

"I find the accused guilty and sentence him to undergo rigorous imprisonment for a term of three months. (Signed) J. H. EATON, P. M."

The cases were tried on the 5th January 1891.

PLANTING NOTES FOR 1891:—

CACAO; COFFEE; TEA.

I. CACAO.—This is really a very paying product where the climate is suitable. The more attention and manure you give it, the more it will respond; but you must protect it from marauding and chilling winds and attend well to shade. Cacao thieving in the Galagedara district is becoming intolerable. The best way to counteract the thieving is to offer large rewards, and make it worth the while of some of the thieves to use their experience in thieving ways on behalf of the cacao planter. This causes a flutter in the thieving circles, and benefits the growers. One planter admits losing 50 per cent of his produce! I wonder what the proprietor of that estate would say. He would not grudge a good deal of money spent on rewards for thieves or reliable watchers in preference to losing one-half of his produce. The men who are robbed are:—1st. The easy-going phlegmatic office man, whose name is anything but a terror to evil-doers, and whose fields draw the most of the thieves to the advantage of his more feared neighbours.

2nd.—The unpopular man who works through conductors and English-speaking middlemen, and thus keeps the respectable villager at arm's length and utterly drives away the influential headmen whose power is great and can be made use of.

3rd.—The man whose ignorance of the vernacular and the customs of the natives prohibits him from gaining secret or stealthy knowledge so as to be beforehand with the thieves.

The man who is not robbed is the counterpart of the above, *i. e.* popular, energetic, physically and mentally powerful, feared by all yet approachable by all, just and wise in dealings with the native, thoroughly conversant with native language and ways. This sort of man will be avoided by thieves, and sought after by the better sort of villagers.

A thief will say of such a one:—" Don't rob that master, he is kind, is friendly with the headman, unmerciful when he catches us, and relentless in hunting us down. Let us go over to ——. Why, he never ascertains if the watchmen are ever watching. We can soon terrify a few Tamils even if they should be there. These Tamils are only brave when their master goes with them."

II. COFFEE.—The general opinion as to this product, even the Coorg variety, is, that so many plagues are lying in wait and cacao is such a sure thing in the end; therefore plant coffee and make use of it only as a help and " lift " to the more tardy cacao which will eventually take its place. It is argued that though Coorg coffee is precocious and apt to overbear in early youth, and thus it is advisable to strip off the crops in the earlier years; yet should one sacrifice say 3 cwt. an acre to trust to an uncertain future? I say, yes. I would recommend stripping the crop entirely off the first year; and the next two years the crop before the berries turn ripe and dry it in the husk; and then you have an established Coorg coffee field which will pay better than cacao. Prune delicately and top high; in fact do everything opposite to forcing the bush. One V. A. mentioned that the crop off the *ends* of the primaries had been stripped to relieve those primaries. Had he taken the crop off the *inside* of the primaries next to the stem it would have been more sensible, but he was taking off the *fruit* he wished to relieve without relieving the branch from the cause of injury, viz.: heavy clusters of fruit at the head of the branch robbing the end of the branch of sap and vigour. Side branches of shade trees should not be cut but the general tree pruned or thinned. I saw at Matale the other day that they had cut up the side branches of fine shade trees and thus reduced objects of beauty and utility to ugly rook-resters or crow-perches. An umbrella held on a twenty feet pole will not give much shadow—and this argument is ten-fold increased when you remember that the shelter of shade is more valuable than the shade of shelter. Of course with leaf disease and green bug one has to go cautiously and avoid monoculture if possible.

III. TEA.—This is a great industry and has rapidly developed in a manner almost startling. The old painful drudgery of standing behind coolies' backs is disappearing. The new method of paying coolies by the amount of leaf, and arranging the totals in the check-roll so that the kanganies can still benefit by the coolies' work fairly, is reducing work to general inspection and careful calculation. Men (male coolies) are becoming less and less desired on a tea estate, and this alone should work a

wonderful reform among the ryots of Southern India, among whom female children have long been very much at a discount. It will recommend itself to oriental ideas, which incline largely to the idea that "women must work and men must sleep," and not "men must work and women must weep." A good plucking girl has thus acquired a new value besides that of personal feminine charms, and the ugliest daughter amongst them, if she plucks well, will soon be adorned with jewelry and sought after by the lads.

As there is such a small difference between the finest and commonest teas, it is found that fairly coarse plucking pays because the factory figures are known, and when once the average is settled say at 10d with coarse plucking, and a margin is left as profit—then the more leaf the more money. Now comes in manure. That horrible yet universal saying, "If you once start manuring you must keep it up," is really doing harm. With the past experience of our climate and its susceptibility to blights surely we should "make hay while the sun shines," and manure heavily and pluck heavily and bank the profits. The old gingerly finicking way,—aiming at appearance and tidiness and pretty teas,—that is all going out. Low pruning and topping two leaves above the fish-leaf *from any point* in the bush, not merely from level but from any sprouting point, thus drawing the bush at all its sprouting points and not allowing side branches to grow up to satisfy the leaf requirements of the plant. No—there must be no satisfaction allowed; the bush must be continually worried and plucked, always leaving first round two whole leaves above fish leaf; then one whole leaf above fish leaf—this to go on for six months. Then half a leaf above fish leaf for another six months. Then down to the fish leaf; and if you have manure you can run a second year and have the labour free for remunerative works. You must have manure, and it must be artificial manure. Cattle manure is all right for cacao or any fruit-bearing trees. We want to stimulate the leaf-producing powers, not the reproductive powers.

The moment the difference between the best teas (commercial) and the common teas becomes sufficiently marked in price and thus sufficiently attractive, then it will pay to pluck fine. Gow, Wilson, & Stanton's Sales Lists have encouraged an unhealthy competition, misleading to proprietors at home and injurious to their interests Proprietors should say to their Managers: "Give me a margin of profit, the higher it is, the greater percentage you will get"; and if the man is worth his salt he will take the best method you may depend on it.

That was a very milk-and-water production regarding COAST ADVANCES emanating from the august Association. It has a decided touch of the "Old Masters" about it, and should be respected on account of its venerable character. But it does not help us a cent. Proprietors and firms have to act and put pressure on their superintendents to secure themselves for the pressure of flushing months in the legitimate market in India. But as for myself, if I want labour and find labour to be had in the local market and am allowed to pay a good price for it, and am urgently in immediate need of it, I shall avail myself of such labour being in the market and deal with such labour for my proprietors' interests. But if I want to establish a force which, as in the old days, I could increase and decrease without robbing, or being robbed by, my neighbours, but by internal arrangements, I gradually encourage a free circulation of my coolies between their scattered homes in the arid plains of India and the clustering well-packed "lines" of a Ceylon estate, and have my labour and advance account so in hand that tundus need be neither given nor taken. It is for proprietors and firms to stop the competition in the local market of paid superintendents who are pressed by irregular and unequal calls for labour and the fluctuations of weather and special flushing periods. Places where there is much carrying of tea chests or rice, or even leaf, will suffer greatly by reason of want of labour, as compared with places favourably situated. Places where other products are cultivated, and heavy works such as holing for new clearings or for manure are carried out, these places suffer as compared with those where the only manual works are plucking, pruning and weeding. Are you then to lay down rules and issue them under the authority of the P. A. rules which cannot be applied universally? The more planters encourage the local market the more they are damaging a valuable labour supply; so the instinct of self-preservation will right the abuse so eloquently complained of by Mr. Young, so long as the proprietors and agency firms are kept awake to the danger.

It is high time the inventive genius which has developed in Ceylon so largely should apply itself to a cheap, light, effective PACKING cover for our tea. The delicate care bestowed on Ceylon packages is cruelly abused by dockers' hobnails and iron shovels; and the expensive dry air obtained by refiring and a carefully constructed factory is ruthlessly allowed to evaporate amidst the damp and smoke of a London warehouse. Then our teas are subjected to all the hurry and waste of a system of sale originally intended for sleepy China, and a comparatively small Indian trade. I believe that if a really suitable package were invented admitting ready inspection and quick and effective re-closing, and a thorough re-organization of the system of public sales made, then our teas which are the most carefully prepared in the world will get more justice and be better appreciated by the trade and the public, and thus give us more margin of profit. Strange to say the Ceylon system has elucidated the fact that an acreage over say 300 acres under tea is worked more profitably in private hands than through Companies. It used to be said that tea, with its outlay in machinery, suited the broader basis of a company with its greater division of risk, but the division of profit composed of fractional margins depends more on the excellence of the man in immediate charge than on any adopted system; and these divisions of profit are apt to be swallowed up by the various charges and the numerous necessary officials of a company.

It is admitted on all sides, that the fierce energy displayed by Ceylon in advertizing herself has revolutionized the tea trade and benefited India immensely. We want reform in the handling of tea by the Customs, and we want reform in the public salerooms. Then if blights are averted the future of the island is now sure. We grow the *drink of the universe*, the relish of the rich, the solace of the poor, a drink wholesome and harmless, and within the reach of all

SUCCESS TO CEYLON FOR 1891.

"1873."

COCONUT BUTTER.

In reply to an inquiry the following reply was sent on the subject of making butter from coconuts:—"My experiments were on a very small scale. The coconuts were scraped out with a *Karni* in the usual way, a small quantity of water added and rubbed in a mortar. The milk-like fluid was then strained through cloth and churned in a bottle. The churn used was a disc of wood of about the same diameter as the bottle, cut with a wavy edge and with holes through it, this was forced up and down by means of an upright handle. The churning was over very quickly, and the fat globules on being formed were skimmed off and washed in salt and water. The kernel which had been strained off was put into a small cheese press, and the fluid squeezed out added to the "butter-milk" and again churned, a further small quantity of butter being obtained. The cake of scrapings still retained its flavour and would be fit for various purposes. The butter was almost tasteless while fresh, but after being kept a day (in the cold weather) had a strong taste of coconut. It had the appearance and consistency of butter but was very white."

The writer continued by stating that the authorities at Kew had been asked by the Society if they could

afford information as to the manner in which coconut butter is deodorised in Germany, but they had stated that the subject had not come before them, and suggested that the information might be obtained through the Government of India; the subject being of considerable interest to India.

Mr. B. C. Basu of the Agricultural Department of Bengal, very kindly communicated the results of his experiments in the following letter:—

"I took four nuts of average size, neither very big nor very small, and had the kernel reduced to a coarse pulp with a native instrument called *Karni*. The nuts were not fully ripe; the kernel was fully formed, but was yet a little soft. After the kernel had been made into pulp, the latter was squeezed in a thick piece of cloth to express the 'milk.' A little water had to be added to the pulp to make the milk run out freely. The whole of the milk could not, however, be expressed, as I had no proper appliances to do the work. The 'milk' was measured and found to be 3 *paos* or roughly 24 oz., of which quantity 1 *pao* may be taken as water added to the pulp in the act of expressing the milk.

"Immediately after the milk had been expressed, it was churned in a soda-water bottle. I intended to use the English churn which I have recently procured from England, but the quantity of milk was too small to be put into a churn. I should mention here, that in the experiment with coconut milk which I made in the last cold weather, I had no need to add any ice or cold water, but in the present experiment which was made sometime about the end of last April, the weather was hot, the consequence being that the butter refused to 'come.' I then added a little iced water to the 'milk' in the soda-water bottle, and the butter grains immediately appeared. The whole operation did not take more than 15 minutes, and could be finished in half the time if cold water was added in the beginning. All that I had now to do was to wash the butter in cold water, and gather it into a lump. The butter weighed just a little over 1½ chittaks or 3 oz., that is 12½ per cent. on the milk. This I considered encouraging; but my surprise and disappointment were great when on opening the vessel in which I had put in the butter, I found that it had all melted and was floating on the top of the water. In the cold weather the butter kept pretty firm day and night; but in the hot weather it would be impossible to keep it solid, unless it was put in iced water. Under the circumstances, I believe it is useless trying to make coconut butter in a hot climate like ours."

In a subsequent letter Mr. Basu conjectured that the butter fats of the coconut might be of two or more kinds, with different melting points, and in that case those that melt at a low temperature might be removed and the balance would remain solid.

In connexion with the subject the following from the Journal of the Society of Chemical Industry is of interest:—

The following is an extract from the last report of the United States Consul at Mannheim on the subject of the manufacture of Coconut Butter in Germany:—

"German Chemists discovered in the coconut a fatty substitute for butter. This discovery was made by a Dr. Schlunk, practical Chemist at Ludwigshafen-on-the-Rhine. Shortly after the discovery was made a firm was established in this City under the name 'P. Müller and Söhne,' which sunk a large amount of capital in an enterprise, having for its object the production of the new article, to which they gave the name of 'Coconut butter.' The results achieved have more than justified their expectations. The firm is not able to meet the constant demands made upon it. Although in existence only one year, it employs 25 workmen, who get from 25 to 75 cents. a day, has a 40 horse-power engine, and produces daily 3,000 kilos of butter, which retails at from 55 to 65 pfennings, or from 13 to 15½ cents. per pound, or 25 to 30 cents. per killogramme.

"The nuts are obtained from almost all lands lying in the tropics, especially from the South Sea and Coral Islands, Arabia, the Coast Countries of Africa, and South America. Natives in countries where the nuts grow have for a long time used the milk of these nuts instead of food oils. It contains 60 to 70 per cent. of fat, and 23 to 25 per cent. of organic substances, of which 9 to 10 per cent. is of albumen. Liebig and Fresnius had already discovered the value of the Coconut oil, or fat, but did not succeed in its production as a substitute for butter. The new butter is of a clear, whitish colour, melts at from 26° to 28° C., and contains 0·0008 per cent. water, 0·066 per cent. mineral stuffs, and 99·9932 per cent. fat.

"It hardens at 19° C. It is better adapted, however, for the kitchen than for the dining-room, that is, for cooking purposes, than for the uses to which butter is put on our tables. It is neither disagreeable to the taste nor smell. In a country where real butter runs all the way from 25 to 35 cents., per pound, and Coconut butter costs but 15 cents., a great future must open up before the latter. At present it is chiefly used in hospitals and other state institutions, but is also rapidly finding its way into houses or homes where people are too poor to buy butter. The working classes are rapidly taking to it instead of the olemargarines, against which so much had been said in the papers during the last two or three years.

"The new butter is said to be singularly free from acids and other disturbing elements so often found in butter, especially that made from milk taken from cows diseased with tuberculosis. Here it is estimated that fully 10 per cent. of the milk-giving cows are so troubled. This absence of acids and other matter renders its digestion much easier, hence the preference already shown for the new article by hospitals and such institutions. There are those who do not hesitate to declare this new substitute as healthier, and infinitely preferable to the too often bad butter brought on the markets, and not to be named in the same breath with oleomargarines made too often from the diseased fat of horse and sheep flesh.

"When it is remembered that Germany has already some 50 factories making oleomargarines and other artificial butters, and that some 180,000 *centners* are produced annually, it will be readily seen that regular butter will have hard work to hold its own in a hundred uses against its new rivals, and especially so since the olemargarines and artificial butters of all kinds are placed under severe, careful, and watchful State Inspectors. It is hoped, however, that no losses, but gains rather, will arise; for besides the profits resulting from the new substitutes more meat and milk, as such, will come on the markets, and consequently into use.

"If, with Köning, we assume that the principal nutriments albumen, fats, and carbon hydrates are paid for in the ratio of 5: 3: 1., *i.e.*, a kilog. of albumen costs five times, and a kilog. of fat three times, as much as a kilog of carbon hydrate, we arrive by comparison of the nutritiousness of milk with other articles of diet, at the following results:—If we pay for 1 kilog. of milk, 15 pfennigs; for a mark we get 21·33 per cent. of nutriment; for 1 kilog. lard (bacon), 172 pfennigs, 16·08 per cent.; for 1 kilog. fatty cheese, 162 pfennigs, 14·32 per cent.; for 1 kilog. pork, 131 pfennigs, 14·01 per cent.; for 1 kilog. veal, 112 pfennigs, 10·33 per cent.; for 1 kilog. beef, 128 pfennigs, 9·11 per cent.; for 1 kilog. eggs, 200 pfennigs, 4·97 per cent.

Now, if these facts are once known, milk as an article of diet will be more in demand, and the quantities no longer needed to make butter will find their way into the families where formerly pure butter was unknown, but where its substitute, coconut butter, has taken fast hold."—*Board of Trade Journal.*

ECHOES OF SCIENCE.

Geologists have proved that the diamond mines of South Africa are situated in vents or chimneys, varying from about 70ft. to 1,500ft. in diameter, and descending vertically through the schists which form the ordinary strata of the district. These vents are filled up with fragments of silicated and magnesian ocks, in which the diamonds are scattered, and

before the diggings began each was capped by a hillock, or "kopje." They are 17 in number, and run in a straight line for about 120 miles.

The question of their origin has recently been discussed by M. Dambrée, a well-known French geologist, at a meeting of the Académie dos Sciences, Paris. They have, of course, been opened by an eruptive force from the interior of the earth's crust, but they differ from the usual volcanic cracks or fissures. M. Dambrée attributes them to the outburst of imprisoned gases, and has made a number of experiments at the Laboratoire Centrale des Poudres et Salpêtres, in Paris, to prove his theory. Explosions of dynamite and gun-cotton were made in a steel cylinder or mortar, and the escaping gases made to perforate masses of rock. Limestone, gypsum, slate, granite, porcelain, glass, crystal, and steel were all fractured and bored in this manner. It follows from his experiments that gases at a high velocity, say exceeding 1,300 metres a second, and especially when aided by heat, are powerful agents of geological erosion. They are able to bore regular vents or chimneys in rocks, if there is a crack or fissure to concentrate their energy in one spot. The diamond vents of South Africa are, in his view, the effect of compressed gases exploding from the interior of the earth at certain points along a line of fissure; and the striæ or grooves observed on the sides of the vent are another proof of this explanation.

Professor Liversidge, F. R. S., of the University of Sydney, has found that certain fungoid growths have the power of removing gold from water containing it in suspension or in solution. Bottles of distilled water containing finely divided gold which had been reduced from a weak solution of the chloride by phosphorus dissolved in ether were allowed to stand for some years, and it was observed that while some of them cleared, others retained the ruby or purple colour characteristic of gold thus reduced. Examination showed that the clear bottles had a purple-blue growth in them, which, under a microscope, appeared as a mass of matted filaments. When dried over a spirit lamp, these filaments exchanged their purple tinge for the metallic lustre and colour of gold. A similar change took place when the growth was rubbed in a mortar.

In some cases the mould or fungus was white and blue-black. The white growths had a blueblack nucleus, and floated on the water. They had an oval shape, and were about ⅛in. in length. Ether or alcohol is food for such growths, and phosphorus is favourable to their growth. There was little or no fungoid when other solvents were used for the phosphorus; for instance carbon bisulphide, chloroform, or turpentine.

Professor Liversidge finds that the mould from cheese or banana skins, as well as bread and other organic bodies, will, when placed in water containing gold, either in suspension or solution, remove it, they acquiring, at the same time, the characteristic blue colour.

A French chemist, M. Aimé Girard, has shown that the potato called "Richter imperator" is well-fitted for the production of alcohol by distillation on a commercial scale. At one operation 78,000 kilogrammes of potatoes were treated, and 10 litres of alcohol, absolutely pure, were obtained from every 100 kilogrammes of the tuber. Another distillation gave 14 litres for the same quantity of roots. The "draff" which resulted was readily eaten by cattle.—*Globe.*

THE CHAMPION SWEDE CROP.—Lord Wantage has this year grown on his Home Farm at Ardington, Berks, an enormous crop of Sutton's Champion and Sutton's Crimson King Swedes, weighing just upon 40 tons per acre. The individual roots were of excellent shape and quality, and were awarded the Champion Prize given by Messrs. Proctor and Rylands, competed for by farmers in the counties of Hereford, Salop, Stafford, Warwick, Worcester, Gloucester, Berks, Hants, Surrey, Oxford, Bucks, Herts, Bedford, Northampton and Huntingdon. Some of these roots will be exhibited on Messrs Sutton & Sons' Stand at the Smithfield Club Cattle Show next month, and will be well worthy a visit.

PINE-APPLE FIBRE.—From Mr. E. W. Dana, Lakewood, N. J., U.S.A., referring to an article on Pine-Apple fibre which was published in the Society's Journal and reproduced in the *Scientific American*, and asking if the writer could furnish him with further particulars as he is greatly interested in the subject. A small sample of the fibre was sent to Mr. Dana, and he was informed that there is early prospect of the Mauritius aloe fibre machine being tried on pine-apple leaf in India, when the results will be published in the Proceedings.—*Agricultural and Horticultural Society of India.*

OUR WEALTH OF LIVE STOCK.—Some interesting calculations of the value of the live stock held by British and Irish farmers, prepared by Mr. R. E. Turnbull, are published in the Journal of the Newcastle Farmers' Club. They are evidently founded, as far as the unmber of animals is concerned, upon the official statistics collected in June of each year. The following table shows the estimated value of the live stock in 1887 and 1889, and the increase in each case within the two years:—

Value of Farmers' Live Stock in the United Kingdom.

Description of Live Stock.	Total value in 1887.	Total value in 1889.	Increase in total value per cent.
Cattle	£100,018,452	£120,702,141	20·7
Sheep	38,417,735	50,826,357	32·3
Pigs	6,511,675	6,835,263	5·0
Horses	35,778,875	45,807,720	28·0

Mr. Turnbull concludes that the total value of the live stock of this country, including poultry and goats, was last year £227,771,481, or at the rate of £4 15s per acre, whilst in 1887 it was only £183,806,737, or £3 16s 9d per acre. The increase within the two years has thus been £43,694,744 or 18s 3d per acre.—*Bell's Weekly Mesenger.*

PRODUCTION OF GUTTA PERCHA.—The probabilities of a future scarcity of gutta percha has been a subject of concern to the French government, which accordingly sent a scientist (M. Serullas) to the Malay peninsula and the adjacent islands to investigate and report on the matter. The results of some of his labors have recently been mads public. M. Serullas states that until some substitute is discovered gutta percha is absolutely indispensible to submarine telegraphy, for other gums cannot be used for tho purpose with any practical results, as they do not possess the proper qualities. While good isonandra trees (from which this gum is taken) are to be found only in the Malaysian Archipelago and the Malaca peninsula, bad species grow all along the equatorial lands. Many efforts have been made to use the gutta percha producod from the inferior trees, but they have all failed. It has beeu foond that submarine cables laid in the same waters lasted same according to the quality of the gutta percha uesd in the covering. The cause of the scarcity of genuine gutta percha is explained by M. Serullas by the fact that the Malaysian natives began by cutting all the trees as soon as they found them in a producing condition. Then, after having thus prevented the production and multiplication of the species, they attacked the youngest trees. Later on they felled trees giving an inferior gutta percha and mixed the gums, which were sold to Chinese merchants, who adulterated and weakened them still more. The extent of that blind destruction is shown by the following figures. In 1845 only 9,000 kilograms (the kilogram is equal to 21/5 pounds) of gutta percha were exported to Europe; in 1857 240,000 kilograms were exported. In 1879 the amount sent from Sumatra reached 135,000 kilograms, and from Borneo 1,300,000 kilograms. It was calculated that in order to obtain that amount the natives must have cut more than 5,000,000 trees. In view of this situation France, England and Holland in 1881 sent scientific missions abroad to study the question, and to explore the producing regions of Malacca and Malay Islands. It was discovered that it was next to impossible to find adult trees, and that the situation was nearly desperate. England caused bills to be postod prohibiting the cutting of gutta purcha trees, and Holland ordered plantations of them to be made, but the latter only produced pecies of inferior quality.—*Bradstreets.*

Correspondence.

To the Editor.

SULPHATE OF COPPER WITH LIME FOR COFFEE LEAF-DISEASE.

Bonn, Dec. 13th, 1890.

DEAR SIR,—Herewith I beg to inform you that I sent on 27th Sept. 1 kg. sulphate of copper (Kupfervitriol) to my Tientsin estate in Bogawantalawa to try it against leaf-disease, and I send today 1 kg. more for further trial. For the last two years there has been a similar leaf-disease in the vines here, and the sulphate of copper (Kupfervitriol) proves a good remedy against it. I saw last September one part of vines sprinkled with this remedy and next to it one part without. On the first part the leaves were of a fine green colour and the vines healthy; on the other part the leaves were mostly yellow and drooping and the grapes tasted not so good as on the sprinkled part. The vine-owners in most places are now forced by the magistrate to use this remedy.

The composition of the remedy is :

1 kilogram dry sulphate of copper (Kupfervitriol)
1 do do fresh lime (Kalk)
100 liters water.

The 1 kg. sulphate of copper is to be dissolved alone in about 10 liters water.
,, 1 ,, fresh lime is also dissolved alone in water, and then these two solutions poured together and the required water up to the 100 liters is poured in.

The lime must be fresh, without sand. The sulphate of copper must be completely decomposed: otherwise the leaves will suffer. The complete decomposition is obtained, if the composition has subsided and litmus paper sprinkled with the composition is not coloured red, otherwise the composition must get more lime-water.

The trees must be sprinkled during dry weather, but not if the young shoots or blossom are coming out. In rainy weather the composition is washed off and must be renewed.

The sprinkling can be made twice or three times in the year: the trees will not suffer, and it is good that the falling leaves be dug in. Sound trees will not suffer by this sprinkling: sound vines here are sprinkled with this remedy to preserve them against infection.

Mr. Bremer on my Tientsin estate in Bogawantalawa can give more particulars, and as soon as I have notice from him that the remedy is successful I shall send to Tientsin a sprinkling-squirt to operate on the bark, by which one man can sprinkle in one day about 1½ acre with 400 liters of the composition.

This remedy should be tried by all planters who have leaf disease in coffee, and I believe it will be of interest for the Ceylon planters if you notice this in your paper.—Yours truly, H. SIXTUS.

[We should be glad to hear from Mr. Bremer the results of actual experiment with this somewhat potent application if it is not properly reduced by water. We believe it to be quite possible that it may thoroughly clear the bushes to which it is applied of the fungus, just as a mixture of sulphur and lime did. But we fear that in the one case as in the other, the result will be only temporary, and that while the spores exist in unlimited numbers, they will again attack the fresh leafage, the mycelium feeding on the life-blood of the plants elaborated in the leaf cells. The only real hope for the revival of coffee in Ceylon, we fear, is the gradual wearing out and final disappearance of the pest. Of that "consummation so devoutly to be wished," we fear there is as yet no decisive sign?—ED. *T. A.*]

TEA PACKING IN PATENT PAPER LINING.

London, Dec. 19th.

DEAR SIR,—You will probably be interested to hear the result of the sale of the consignment of Elkadua tea sent home packed in the new patent paper lining.

The break in question consisted of 32 chests, 16 of which were packed in the new lining and 16 in the ordinary lead. They were put up at public auction last Tuesday, and both commanded identically the same bid. You will see by the brokers' circulars that the paper is very favourably reported upon. On arrival of the tea I went to Arthur Street Warehouse and had the packages opened before me, and in no case was there one single tear or damage of any kind. The superintendent appeared much pleased at the facilities for bulking and sampling purposes afforded by this new style of packing as compared with lead; for whereas with this latter cutting is necessary the paper is so fastened at the top and bottom of the chest that the insertion of a man's finger is all that is required to undo it without any tearing whatever.

As you may remember I tried a small break in 20lb boxes some months ago which was put up at public auction with precisely similar results as the present lot; but before bringing the matter definitely before the public I was anxious to see how the paper would succeed in the larger packages. This has now been done, and as already shown I think the result must be considered so far as one can see an entire success. It now remains for planters generally to take the matter up. They will naturally ask what they are to gain by the innovation. My answer is simple. To pack a 100 lb. chest with the ordinary lead lining costs say R2 or at the moderate rate of exchange of 1s 6d 3s 0d, while his cost of lining the same size chest with the patent paper would be f.o.b. London nett 1s 4½d

or a saving on each chest of 1s 7½d exclusive of saving in freight &c. Surely this is good enough for most planters: it is for me. Prejudice ever has been and ever will be rife, when suggestions are made to leave the beaten track, and often prejudice proves itself in the right, and in the present instance I confess I have not been without many a question as to ultimate success—not so much as doubting the paper itself, but as to how the trade would take it. In talking to an influential grocer with a large business one day on this point, his reply was "If the tea is all right sir, we don't look much to the packing," and so I say while prejudice may be to some extent wholesome, it may at the same time perhaps be carried too far. In conclusion I can only say, that in bringing this new packing before the planters and merchants in Ceylon, I am calling their attention to an article which I have thoroughly tested myself and which I think they will find, if they try, that it will achieve the point arrived at, which is to reduce materially the price of one of the most expensive items in the cost of our tea, and that this will be done thoroughly, consistent with maintaining the quality of the tea itself.

Mr. Ambrose of Elkadua will I feel sure be pleased to afford any information as to packing &c., and consignments of the paper can be made

direct from this office or subsequently can be obtained from our Agents in Colombo.—Yours faithfully, J. M. MAITLAND KIRWAN.

P.S.—Since writing the foregoing, I have given instructions to de-patch of a consignment of the paper to the Colombo Agents, where it can now be had. J. M. M. K.

CACAO CULTIVATION IN CEYLON.

SIR,—In looking over the report of the Lanka Co. I notice that their cacao estate gave a profit during the 1 st year of about 25 per cent on the amount this property stands at in their books.

What does your correspondent "Eldorado" think of this?

I do not know what return on capital is considered to constitute an Eldorado, but I fancy 25 per cent would be considered by most of the shareholders in the Company ELDORADO ENOUGH.

SIR,—Evidently our estimable friend "Eldorado" is not interested in the Lanka Co., or he would not attempt to traverse my suppositions as to the feelings of shareholders. I have nothing to add to my previous letter on this point and nothing to retract. But does he in all seriousness expect a cacao estate not yet in full bearing to pay 25 per cent on its cost calculating this with compound interest at 8 per cent? It would appear indeed that there was a time when some such fantastic dreams floated before his heated imagination. How I wish, dear "Eldorado," that we had foregathered in those happy days of your:

"When all your geese were swans, lad,
And every lass a queen!"

We should not have been long. I'll go bail in unearthing some confiding capitalist, and this is how we would have put it, *n'est ce pas mon ami?*—"In other producing countries" (there is a judicious vagueness about the phrase which lingers on my palate; if he had remarked that the yield in Trinidad, say, was less than we stated, we would have fixed him with Venezuela or the Celebes Islands).—"In other producing countries" the average crop is not less than 6 cwt. per acre with a primitive cultivation. In Ceylon, where tropical agriculture has been thoroughly studied and developed to a point of perfection unknown elsewhere, we shall be well within the mark in placing our production at 10 cwt., which, cured as it will be with the latest inventions of our XIXth century civilization, may be relied on to fetch 100s per cwt. all round. We have, then, a gross return of £50 per acre, or allowing £5 an acre for a liberal and scientific cultivation, a net return of £45 per acre showing an income from the 500 acres property we have in view of £22,500 per annum.

"To a well-informed man like you, sir, it is unnecessary to point out that the variety of cacao chiefly grown in Ceylon is exactly the same as that in "other producing countries" and that it is entirely planted in the finest virgin soil, no old coffee land whatever having been rushed into this product so that the yield of "other producing countries" gives us an accurate basis of comparison in every way, and we have only increased it from 6 to 10 cwt. on account of the well-known advantages which our island possesses.

"There are those who will tell you that a considerable proportion of the land appearing in the Ceylon Directory as under cacao ought never to have been planted, that practically the whole crop comes from a much smaller average, and that planters in their dislike of a "primitive" cultivation made the most fatal mistakes in the early days of the enterprise—do not, my dear sir, give any credence to these malicious statements.

"In conclusion, Mr. Moneybags, we cannot too strongly urge on you the necessity of appointing two thoroughly experienced managers one for the London office and one for the estate. We believe we are in a position to name to you two parties who would be prepared for the nominal salary of £2,000 a year each to undertake the onerous duties of those posts, and we are confident that whatever your position might be at the end of a few years, they at least would find it

ELDORADO ENOUGH."

P. S.—Joking apart, if your correspondent started with some such grand ideas as the above I do not wonder that he has been disappointed, and he has my sincere sympathy. I believe however and shall continue to do to till convinced by stronger argument than he has yet advanced or by the inexorable logic and fact that a well-chosen, carefully cultivated cacao plantation in Ceylon offers as good an opportunity for remunerative investment as any other product in the island. Because mistakes have been made, which we all know is the case, is no reason why mud should be thrown at the whole enterprise. E. E.

CACAO CULTIVATION.

DEAR SIR,—Some weeks ago, one of your correspondents, who seemed to be disappointed with the results of the past few years, quoted figures from your Directory showing that the average yield of cacao was only $1\frac{1}{2}$ cwt per acre in bearing. Another correspondent, more fortunate, gave his returns as 2 or 3 cwt. per acre, but no higher figures have been quoted.

As the total exported includes, of course, all the cacao stolen from estates and sold through native traders, actual return to proprietors must be very low indeed. At a moderate computation the quantity stolen may be reckoned at ten per cent: many individual estates losing very much more.—Yours faithfully, POWDER AND SHOT.

WIRE SHOOTS.

Dec. 20th.

DEAR SIR,—"Shoot"'s letter of 10th inst. asking if "a wire shoot can be worked at a gradient of one foot in seven from point to point with a road tracer" has been drawn to my attention, and my opinion is that a shoot can be made to work at such a gradient.

If the land between the two points is of a similar gradient, in my opinion it would be necessary to have intermediate supports to carry the wire to prevent it from bagging. If the shoot is not a very long one and wanted to cross a ravine or gulley, intermediate supports would not be required.

On large tea estates where transport of leaf and fuel from a higher to a lower elevation is an expensive item, wire shoots will by-and-by, I have no doubt, become as common as spouting which was found so useful in the coffee days.

These shoots can be made to tap the different fields of the estate *en route* by a simple arrangement of shunts at the various receiving houses or turnings, so that bags of leaf and billets of wood will be seen flying through the air like miniature trains zigzag fashion from the top of the estates to the factories at the bottom. Where estates are not very steep, and as managers acquire a thorough knowledge of regulating the loads, they will, later on, where the gradients are easy, find it perfectly safe to slip the small pulley with pocket brake and cord they carry for the purpose on to the shoot, and without any exertion descend from any one point to any other of the estate along the line of wire, at the rate of 10 or 12 miles an hour.

With so many able engineering firms in the country, I have no doubt that when the demand arises for the wire shoots to do as I have tried to describe, they will be made and guaranteed to work satisfactorily.—Yours truly, OLD HAND.

ON FORKING TEA LAND:—NO. 1.

DEAR SIR,—I see no difficulty in reconciling the deep-hoeing system of Assam with the danger of the same operation on Ceylon upcountry estates. All organisms adapt themselves to their environments so long as these minister more or less to their requirements. In proportion as these are favorable the plant (in the case we are considering) flourishes, or, in their entire absence, dies. If the humus and other plant food be *equally distributed* through the soil, however

sparse, down to two or three feet, the feeding rootlets will follow it in the same degree. On nearly flat land, as I believe is the case in India, the rain moisture tends to sink in rather than flow off, and this mechanical action having been always in force has carried the solubles with it to a depth below the surface: hence the necessity for "deep hoeing" to reach the feeding ground of the plant. But where, as on our hill-sides, the true soil is all on the surface, getting thinner and thinner every year as the rain rushes rapidly off, the feeding rootlets confine themselves to those few inches; and if you destroy them all round the tree at the same time that you prune the top, only a climate like Ceylon would prevent such drastic treatment, killing the plant outright. There are roots which find their way down to great depths, as may be seen in any deep cutting; but these are generally single feelers, or explorers after food and moisture, and only develop a network of feeding-roots at their ends when they find it. This, I think, is their function; but on old coffee land in Ceylon the surface only for a few inches down is absolutely filled with fibrous roots. I have no doubt there are fields of tea in Ceylon which can be as deep-hoed as in Assam, but not on our steep hill sides without the utmost care. In this respect each field must be treated as we find it.

But our great sheet-anchor is climate. I remember years ago turning my back upon Dimbula (where just before the great coffee boom I could have bought several estates cheap) frightened at the shallowness of the soil compared to my own Uva. I lived long enough to see those estates bear large crops of coffee, and they are flourishing still. Even where all surface soil is gone, given healthy trees established and roots well covered, the climate alone will give 200 lb. an acre. But you will find all the feeding roots at the surface, and where is the cause for surprise that if these be all destroyed the tree sulks? Top-dressing would be enough if we could keep it from being washed off, and in suitable places I have seen very good results from this with no digging at all.—Yours, R. W. J.

[In the portion of Dimbula we are acquainted with, the soil is deep. We have seen the hoeing process in full operation on the hill-sides of Darjiling, which are as steep as the Ceylon mountains. In a description of work on a tea garden on the northern spurs of the Himalayas, too, we find such passages as the following:—

"Right and left the trim round bushes run in exact order, the rich brown earth turned up between them.

"Many of the coolies seem to think clothes superfluous luxuries; for they are attired in a single coat and their own long bare legs. How distinctly one can see the sinews work under the smooth brown skins, as they raise the heavy hoe high in air and then come down with a thud, detaching a heavy clod of earth from a neighbouring tea bush.

"Presently the sahib has registered the names, sounded the depth of the digging here and there, chatted with the Jemadar, and then turned leisurely homewards—leaving behind him the spruce tea bushes, the bending supple figures, all enclosed in ranges of grey-green misty hills, topped by the unmelting snows."
—ED. *T. A.*]

FORKING TEA:—NO. II.

Dec. 22nd.

DEAR SIR,—I have been very much interested in the letters about forking tea. I have little personal experience in forking, but I have a wider experience in regard to the forking carried on on neighbouring estates. I have always been against the *system* of forking *as carried out in Ceylon*; and I did not suppose that so many men of experience were of the same way of thinking. I only forked 20 acres about 5 years ago, and it threw the tea back for a couple of years. The 20-acre field was a light soil, and deep forking properly carried out is beneficial only on clayey soils. A neighbour of mine has had very marked success in forking, but the soil on his estate is largely composed of clay and he simply loosens the clods without turning them over.

The system of digging in India is quite different from that carried out in Ceylon. In India the digging is done with hoes, and in Ceylon it is mostly carried out with forks 18 inches long in the prongs, and I am of opinion that the leverage applied by forks with such long prongs shakes the bushes to their very foundations. I opine that forks with prongs only 9 inches long would show quite different results, and a light digging applied with such forks in October would conserve the rains of November and December which come in heavy plumps and 75 per cent of which is lost by running off the soil.—Yours faithfully,

J. F. R.

CACOA CULTIVATION IN CEYLON.

Kandy, Dec. 29th.

DAR SIR,—A correspondent in your Supplement of 23rd wants to know what "Eldorado" thinks of the report of the Lanka Company concerning cacao.

1st. The return of crop is under 2 cwt. per acre which in face of the fact that in other producing countries the average return with a primitive cultivation is 6 cwt., is a poor return, although above the average of this Island.

2nd. In your Directory of 1883-1884, Yattawatte estate is put down as having 435 acres of cacao in cultivation. In the last report there are only 371 acres, or a decrease of nearly 15 per cent even if no new land since then has been opened in favoured spots.

3rd. The 25 per cent profit which your correspondent takes to be the result of the Lanka Company's report, is by no means the correct one from a financial point of view which has to be worked out allowing 8 per cent compound interest per annum on capital invested. Had your correspondent the figures to make such an account he would find that he has no reason to be sanguine nor to add "enough" to ELDORADO.

COCONUT CULTIVATION BEYOND THE DEDURUOYA.

Rajakadaluwa, Chilaw, Dec. 31st.

DEAR SIR,—In your account of the coconut industry of Chilaw, there is an error which in justice to another should be pointed out. The first coconut plantation opened up north of the Deduruoya river in this district was at Sittamadam and is owned by our genial unofficial Police Magistrate and leader of the Chilaw bar, Mr. Thos. Cooke. So this gentleman is the "pioneer."—Yours faithfully,

GEORGE D. MILLER.

CEYLON TEA EXPORTS IN 1891.

Strathellie Tea Co., (Ltd.), Nawalapitiya,
Jan. 1st, 1891.

DEAR SIR,—I am today reminded of my promise to send you my computation of probable total exports of tea from Ceylon during Commercial Season, which is now made concurrent with the Calendar year.

My figures for the Fiscal Year ran, you will remember, to 52,000,000 lb. Taking 25,000 acres as giving their first returns and a reasonable increase from say 30,000 acres (mostly in the younger districts and Uva) I arrive at 54,000,000 as the figures of probable exports, thus:—

70,000 acres	at 340 lb, per acre	=	23,800,000 lb.
45,000 "	300 "	"	13,500 000 "
35,000 "	250 "	"	8,750,000 "

30,000	„	200	„	„	6,000,000 lb.
25,000	„	100	„	„	2,500,000 „

Total say... 54,550,000 lb.
Deducting for local consumption... 550,000 „

Probable total exports say... 54.000,000 lb.

Yours faithfully, ARTHUR E. SCOVELL.

PATENT LEAD-PAPER.

Gartmore Estate, Maskeliya, Jan. 2nd.

DEAR SIR,—Allow me as representing the owners of "Clark's Patent" lead paper to reply to your editorial on the subject of Lead Lining for Tea Chests, appearing in your issue of 30th ulto.*

The reports that you say have reached you regarding the satisfactory results of shipments of tea made in "Clark's Patent" lead paper are correct, and I would ask you still further to suspend your judgment until I am enabled to find out who has been using worthless imitations. This paper lead has been protected by the Ceylon Patent No. 323 of 1889, and the application of it as a lining for tea chests &c. by the United Kingdom Patent No. 9,099 of 1889. I have a list of the shipments of tea made in chests lined with this material, and in no single instance has any fault been found with it, but, on the contrary as the enclosed list of testimonials will show you (from utter strangers to the patentee and from leading brokers in London).

All the "Clark's Patent" lead paper hitherto used has been prepared in the island, and *from Messrs. W. and R. Johnston's Tea Lead ordinarily used for packing tea*—none of it having been under 4 oz. weight. If your London correspondent's statement as to the perforations he noticed in one sample shown him, is correct, I shall feel obliged if he will furnish me with further particulars regarding the parcel of tea in which it was used. In his previous letter, however, I think, he made no mention of the lead having been lined with paper, or I should have taken notice of the matter at the time.

It must not be accepted as a fact, what your London correspondent only gives as an opinion of a London tea taster. His statement is ambiguous; but if he infer that the sample of tea referred to was packed in Clark's Patent Paper Lead, I challenge the correctness of his opinion. I should be glad to know more about it, the name of the estate, and the vessel it was shipped by.

Your London Correspondent after condemning all paper lead linings for tea chests proceeds to describe a "new discovery" as follows:—"The working of it is of quite a distinct character from that of all the so called lead paper, hitherto tried. There are manifestly, from their feel, of paper coated only with lead, while this is equally manifestly of lead, only lined with paper. There is therefore a very sufficient and capable distinction to be drawn between their respective characteristics." The above is a very fair description of "Clark's Patent" Lead Lining! In the specification of the Patent the description runs:—"a lining of paper, cloth, calico, or similar material, or one or other of the combined &c., &c., to the lead used in packing tea." From the above you will see that your correspondent has had worthless imitations brought to his notice. Clark's Patent paper lead is manifestly dearer than the ordinary lead, being made from it, but it can be prepared at very little extra expense, and the advantages of it are beyond doubt. The lining is considerably strengthened, and not so liable to be damaged when packing the tea, or afterwards in bulking or sampling in the bonded warehouse at home. It further preserves the tea, and also prevents the actual contact of the tea with the lead which is considered by many medical men injurious to health. So convinced am I that the lining is a success, and a real gain over the trifling cost, that not a single package has left my factory not lined with it. Two sample boxes packed and kept in store for a year were, a short time ago, sent to Messrs. Gow, Wilson & Stanton for their report &c. They reported that it arrived "in excellent condition" and sold for 1s 5d. and 1s 4d. per lb. respectively. The parcel of Gartmore tea which sold for 10s 6d. per lb. in London, the other day, was similarly packed.

A shipment of the lead paper has been received from England, by the agents of Clark's Patent, the Colombo Commercial Company, Limited; but it has been so badly prepared, and packed, that it has been withdrawn from sale. Suitable paper, of the correct width and any length, can be procured from the Colombo Commercial Company, Limited, and authority to use it or lead of sufficient thickness and good quality,—Yours faithfully,

T. C. ANDERSON.

* See page 541.—ED, T. A.

SULPHATE OF COPPER FOR COFFEE AS RECOMMENDED BY MISS ORMEROD.

SIR,—Can you or any of your readers inform me through your columns, where this can be purchased in Ceylon and what its cost about is?

Also how it ought to be applied to coffee suffering from green bug and what season is the best—in sunny, cloudy or rainy weather; also if it should be applied just before the attack is renewed or only after it has made its re-appearance—*i.e.* is it simply a deterrent or a *potent extinguisher*?—Yours faithfully, O.

P.S.—There are fine fields of coffee in Haputale, and every effort should be made to preserve them—who shall say if they will not eventually prove the nucleus for a renewal of the coffee enterprise in the hill districts of Ceylon. I could instance at the *present moment* one case of a field of over 100 acres bearing at the rate of cwts. 8 (eight) per acre. How will this compare with profits from tea at its best, say with Mariawatte 100 acres?

[This Uva correspondent will find some of the information he wants in Mr. Sixtus's letter on page 573. Certainly, every effort should be made to fight the enemies of the good coffee remaining in the country. Let our correspondent work out the profit-reckoning between coffee and tea in bumper crops and send us the result.—ED. *T. A.*]

TEA LEAD *VS.* PAPER LINING:

January 10th.

DEAR SIR,—Mr. Maitland Kirwan in his letter advocating the use of, or a trial given to, his "patent" paper, starts on the supposition that the ordinary lead used, costs on the estate R2 per chest or 3s stg. as against his paper costing 1s 4½d in London, or a saving of 1s 7½d per chest.

My last purchase of lead was one box at R13·50 per cwt. in Colombo. 5 oz. lead which is now generally used in preference to 4 oz. lead, gives 28 sheets to the cwt., or at above price costs 48 cents per sheet. It requires a little under 1½ sheet to line a full chest 24 by 19 by 19 (outside measurement), so that the lining with 5 oz. lead costs in Colombo 72 cents. In England I have no doubt, 5 oz. lead can be had under 15s per cwt. f.o.b.

but taking it at that price, the lining would cost 9¾d per chest, as against Mr. Maitland Kirwan's paper at 1s 4½d. This is not good enough for Ceylon planters. However, it may suit the inventor.

Your proposal to have a Committee of the Planters' Association to enquire into inventions and new processes in the manufacture of tea, &c. is an excellent one, and I trust it will be adopted. The Committee should first of all agitate for a reduction of the cost of Patents. At present it is prohibitory.—Yours faithfully, PLANTER.

COFFEE LEAF-DISEASE AND SUGGESTED REMEDIES.

Bombay, January 7th.

DEAR SIR,—I have read in your paper of November 15th a letter from Messrs. W. and A. Gilbey under the heading of "Enemies of Coffee and Remedies,"* recommending solution of sulphate of copper as the best means of destroying the pests which beset the trees.

The remedy suggested is certainly an effective one, but the method of applying the solution is so expensive and difficult that few would resort to it on coffee estates which are hilly and steep.

If 30 gallons of this solution are necessary on an acre of vines, it would, at the rate of 2 gallons per tree, necessitate about 2,400 gallons on an acre o coffee. Application of the solution by means of a force pump would cause a deal of wastage, for in order to saturate a whole tree efficiently 2 gallons of the solution would not count for much.

What is necessary is a simple and inexpensive remedy that would lay hold of these pests and exterminate them. To find this out I have been trying different modes of destroying them, viz.: 1 by solution of gum arabic, 2 rice starch, 3 pipe clay, 4 black clay, 5 Mooltan clay and 6 red clay. Each of the last four substances was by itself mixed with water and made into a paste. A paste of each of these four was also separately prepared with solution of gum arabic and rice starch, making in all 10 sorts of pastes. To test the adhesive properties of these pastes, I applied each of them (with the finger), on leaves of different sorts, gathered in a flower garden, and while watching the process I found that each leaf after about three hours of application began to curl up, and cracks became visible half-an-hour later in the surface of the paste applied which fell off in pieces on mere touch, leaving no trace of it on the leaves, which resumed their former shape immediately after. The result arrived at in all the ten cases being the same, I would recommend the last of the ingredients, *i.e.*, red clay, which can be had in large quantities from every coffee estate without any outlay. The clay should first of all be rid of all sand and gravel which it is generally found mixed with, and then made into a paste of thin consistency say that of oil paint ready for application, and applied on the back of the leaves gently with the finger, taking care not to rub it hard.

I may state that the experiments I tried were on healthy leaves, and not on those attacked with the bug or other disease, as I could not procure any of such; but I believe the paste, if it is applied to leaves attacked by the bug &c., would fall off sooner by the movements of the insects which they would be forced to exercise. To prevent this early falling-off of the paste, country soap soaked in water to form a paste of some consistency, and mixed with equal part of red clay paste, would answer well, and adhere to the leaves for about 6 hours. An application of simple soap paste minus the red clay would also give the same results, but for the sake of economy I would recommend a mixture of both soap and clay paste.

Red clay should be prepared for paste by soaking it in double its quantity or more of water in a large tub, and let it remain for a time without stirring. It is to be well stirred with hand afterwards, and filtered through thin cloth, and allowed to settle, which being accomplished the water is to be gently drained off and the residue will be the paste required.

The country soap I have alluded to is imported into Colombo from Negapatam and can be had in the bazaar. Large tubs and galvanized iron buckets are the only expensive items necessary for the purpose, the rest being manual labour which any efficient estate manager would be able to furnish himself cheaply.

I have forwarded through a friend, who left here for Colombo on the 2nd instant, two packets to be handed over to you, one containing samples of the different sorts of clay and soap, as well as soap and clay pastes; the other two leaves, one anointed with soap paste, the other with soap paste and clay combined. These packets should have reached you by about the 6th inst., and the adhesiveness of the paste on each of the leaves must have been observed by you.

If these applications do not prove of sufficient efficacy to destroy the bug, &c., I would recommend a strong solution of alum (which is cheaper and not dangerous to handle as compared with sulphate of copper), to be added to any one of the two pastes I ha e above described. What the strength of the solution of alum should be I am not in a position to state, and leave it to the experience of those better able to form an idea on the subject. Alum could be procured in Bombay at about R4 a cwt.—Yours &c., K. H.

[This letter, the experiments recorded and the substances of which specimens have been sent are interesting, but surely our correspondent cannot be serious in writing of the application of clay, starch, soap, &c., by hand! The expense would be prohibitory. The difficulty in regard to scale insects, and especially in dealing with the coffee fungus, does not arise from inability to kill the pests actually on bushes. The problem to be solved is the extermination of the insect eggs and the fungus spores. The soap and the clays can be seen at our office.—ED. *T. A.*]

* See page 461.—ED. *T. A.*

CACAO CULTIVATION IN CEYLON.

Kandy, Jan. 14th.

DEAR SIR,—Your jocular correspondent "Eldorado Enough" asks in your issue of 8th.* "But does he ["Eldorado"] in all seriousness expect a cacao estate, not yet in full bearing, to pay 25 per cent on its cost, calculating this with compound interest at 8 per cent?"

Let me put my answer on a firm basis, for he seems disposed to pierce it with his wit. Being given an estate of upwards of ten years old, of which 15 per cent has gone out, I do expect it to give 25 per cent on the actual capital which has to be rapidly amortized, considering the great many blanks there are in the lottery called "cacao cultivation."

Would the facetious "E. E.," if the coffee enterprise, starting under the same conditions as he surmises that I based my calculations upon, had obtained the results he mentions—would he, I ask,—have had the audacity to suggest his receiving £2,000st. as the family physician of Mr. Moneybags?

No cultivation, except rubber, has offered such disastrous results in this island as

* See page 574.—ED. *T. A.*

that of cacao: after six most promising years during which the trees flourished under all conditions, a sudden mysterious scourge as bad if not worse as the coffee disease has devastated the most flourishing plantations, destroying one-third of the trees and leaving the balance in such a lingering condition that the very small average production in place of rapidly increasing has remained stagnant and has been reduced last year by 3,000 cwt.

If the crop comes from a much smaller acreage as the humourous "E. E." asserts, the amount of land which the scourge has laid bare is increased, which does not better the aspect of the cultivation.

Ingenious "E. E." has forestalled my intention, but leaving Trinidad and the Celebes apart, does he know that the crop of the Puerto Cabello* District in Venezuela, chiefly sold in France and Spain, comes up to the average I mentioned (6 cwt.) as also the one of the Catholic Republic of Ecuador, the export of which has varied from 310,000 to 340,000 cwt. a year for the last decade, besides the local consumption which is very general amongst the one million inhabitants of Spanish descent.

The pleasant "E. E." speaks of the "fatal mistakes in the early days of the enterprise." If he would clearly point these out to his ignorant brethren they might get up a subscription perhaps equal to the snug sinecure of £2,000 for which he hankers.

"Ne faut-il pas essayer pour réussir?"

If exposing blunders is synonymous to throwing mu', I prefer doing this than to bolster up a languishing industry to make it appear an

ELDORADO.

[Does our present correspondent not allow that Ceylon planters of cacao having discovered the proper management of shade, are in a better way now than some years ago? We were recommended the other day to visit Gonambil as an example of the great improvement effected in cacao plantations.—ED. *T. A.*]

TEA LEAD *vs.* PAPER LINING.

January 16th.

SIR,—I do not want to find more fault with "Planter" than I can help, because he has done us a service in commencing the ventilation of this subject. His quotation of Colombo price of lead however at R13 50 per cwt. is not quite fair. I paid last month R300 for a ton, and see that another firm charged R310 for the same lead mentioned by "Planter." This would make 83c per chest instead of 72c. A committee of enquiry into inventions would be of great service. B. L.

TEA IN ASSAM.—At the close of last year the number of tea gardens borne on the District registers in Assam was 868. The number of gardens opened during the year was eight, and three were removed from the registers, of which one was closed and two amalgamated. The area of land held by tea planters is said to have increased from 955,499 to 1,000,665 acres. This increase, appears to have been largely due to revised figures of area having been submitted by some gardens, and it is impossible to tell what the real extension of tea planting amounted to.—*M. Mail*, Jan. 6th.

* The apostle of Tropical Agriculture "Peppercorn" who occasionally imparts instruction to the Ceylon planters, recently wrote under a misapprehension that the earthing of cacao was easily detected in the market and considered a fraud. It will surprise him to learn that this highest priced cacao is always unmistakably earthed. In France and Spain I know the earthed kinds generally to be preferred by manufacturers. In Bordeaux the price ranges from 175 to 190 frs. per 50 kilos of the Puerto-Cabello cacao at the public sales. (£7 to £7 12s. per cwt.)—E.

HYDROCHLORATE OF COCAINE.—The Madras Government is not at present prepared to institute any experiments in the manufacture of this article as suggested by Dr. Macnamara.

COCONUTS AND CINNAMON.—Kadirana, Jan. 3rd.—There has been no rain since the 12th of last month, and a nasty dry wind is blowing, inducing colds, fevers, rheumatism and aches generally. This state of things and a bud with blossom just appearing, makes peeling of cinnamon difficult. Some estates have already stopped work and the others will soon have to follow. The rainfall for 1890 is 53·46 inches, being 31 inches less than the average for the previous four years. This does not look well for cinnamon and coconut crops next year; and both I fear are bound to be much below the average.

THE PROFITS ON CATTLE SPICE.—The profits from the manufacture of cattle food, as shown in the prospectus of a well known Cattle Spice and Poultry Food Company, are almost on as liberal a scale as those drawn from patent medicines. A business which manufactures a ton of stuff for £6 6s 4d, and sells it for £27 9s 2d, is the sort of thing everybody would like to be in. But, apparently, the opportunity is not to be given to many to share in the profits, for, though £60,000 of the capital of the company is nominally offered to the public, more than half of it is to be applied for by the directors and their friends.—*Financial News*. [The above we reproduce for reasons which will be obvious to the reader. Such profits are extortionate.—S. D. & Co.]

UTILIZING THE POWER IN WATER MAINS.—The New York *Engineering Record* says:—"J. Gibson, of Ayr, Scotland, proposes to utilize the power in waterpipes under pressure by forming a by-pass or junction with the water main, through which the whole or any part of the water in the main may pass. In this by-pass is placed a spiral motor, the spindle of which projects through the elbow of the by-pass, so that it can be connected to a machine, to be driven without any loss of water. It is proposed to place suitable stop-valves in the supply-pipe and by-pass in order to regulate the quantity of water passing through the by-pass, and also to permit of repairs to the motor being made."—*Bradstreet's*.

BINNY'S COFFEE WORKS.—There is no localised centre of industry so busy at the present than the well known and long established Coffee Curing Works of Messrs. Binny and Co., situated close to the Cantonment Railway Station. Operations are in full swing just now, and the inside of the buildings afford a pleasant and practical illustration of successful work carried out in a systematic and well conducted manner. Coffee from all parts of the Mysore Province—and outside too—is pouring in, and the various provisions of drying, peeling, sizing, sorting, garbling and packing for the home market are carried out with a precision and arrangement, entailing an order and supervision, which reflects much credit on the establishment. Many years' experience in these matters have led to the introduction of many improvements in the machinery and the internal arrangements of labour which have resulted in the curing from Binny's Works being classed among the best seen in the London Market, and Mysore coffee has during the past seasons maintained selling figures which must be very encouraging to all concerned The coffee works give employment during the season to over one thousand hands, and from the liberal treatment accorded to the operations, we believe, that while it is sometimes difficult to get labour in the open market the coffee works never experience a dearth of hands.—*Bangalore Spectator*.

LORD DERBY ON TECHNICAL EDUCATION.

The annual meeting and distribution of awards of the Liverpool School of Science and Technology took place on September 25th in St. George's-Hall, under the presidency of the Mayor (Mr. Thomas Hughes). There was a large attendance.

The Chairman mentioned that Lord Derby had given further evidence of his interest in the school by giving £200 to provide two more special prizes.

Lord Derby, who handed the awards to the successful students previously, delivered an address on technical education. He said—Gentlemen,—You have asked me to attend this meeting and to deliver the prizes earned within the year. That is a duty which I undertake with pleasure, because, having watched from the beginning this School of Science, and I may add, having been one of the earliest contributors to it, I am satisfied it has done good and useful work in the past, and that it is capable of doing much more if only adequate support be afforded. It has lived as yet less than 30 years since its foundation, in 1861. Its progress has been steady and not slow. From 28 students in 1865 the numbers have steadily increased to 905 at the present date. In all since the opening it has been attended by 12 916 students, and the total cost has been £26,760, being an average of £920 yearly. I am told that our students have been mostly, though not exclusively, taken from the artisan class. Of the practical results of the school we have no cause to be ashamed. It is never possible to state them in an entirely satisfactory way, because the exceptional success of an individual here and there proves less in favour of the training which he has received than a high average of attainment which does not so easily admit of evidence in a statistical form I am told that very many of our students are employed in all parts of the world as marine and civil engineers and builders; that the winners of the prize which you have been kind enough to call by my name are nearly all in responsible and important positions. One is a manager of the Mersey Forge. One is an expert in the Patent Office. One is an architect and surveyor to the Board of Works in London, and others are in various capacities which I do not state to you in detail, because the list would be too long. The school has suffered, like most institutions, from "that eternal want of pence which vexes public men." I am told that its space is utterly inadequate, and that increased accommodation is urgently required. But there is some comfort, on the other hand, to be found in the prospect that when the Technical Instruction Act is in operation, as it is expected to be, the corporation will come to its assistance, and meet what is no doubt an increasing and urgent popular demand. (Hear, hear.) Of the practical utility of a school of this kind you have heard enough, and it is needless to prove what nobody doubts. The necessity of technical instruction, if our workmen are to hold their own against foreign rivals, is a common place of the platform; but we must not forget that there are other objects to be served, less pressing—some would say less practical—yet in their ultimate results surely not less important. You will not expect from me, who can claim no relation to science, except that of a respectful admirer and in some very humble degree a student, a disquisition on the use and value of scientific training; but some facts are clear, and need no special gift of observation to detect them. Ours will be remembered as pre-eminently the age of science, I might say throughout the civilised world, but more especially in England. In literature our age has done well, but we can scarcely, perhaps claim to rival the generation that gave us Shakespeare and Bacon. In politics we cannot judge the work of our time. We are too near it, and we have not seen the end; but the changes of our day, many and important as they are, can scarcely be set alongside the Reformation of the 16th century, or the civil wars and revolutions of the 17th. I speak here not as judging any of these movements, but only as weighing their relative magnitude and importance. In regard of wars and of conquests, happily we have little in the last 50 years to look back upon. But the triumphs of applied science in our day are the veriest commonplace. To dwell upon them would be absurd, and in such matters one success leads to another. More than that, spread as civilisation is over the whole earth, there is no fear of such a reaction of barbarism and ignorance as that which followed the decadence of the Roman Empire. Whoever wishes to see an admirable summary, at once concise and comprehensive, of scientific progress in the last half century will find it in a little volume by Sir John Lubbock, published this year, which has no fault except the rare one of too great brevity. In this one respect I think we may praise ourselves without fear of seeming ridiculous to the next generation. Our successors may excel us as writers, as politicians, as soldiers; they may surpass even the industrial energies of the present time, but it is not likely—it is scarcely possible—that in the region of science, the 20th century should witness advances greater than, or as great as those of the 19th. (Hear, hear.) The general experience of the world hitherto has been that brilliant but brief epochs of advance have been followed by long intervals of stagnation, and sometimes even of retrogression. Retrogression is not likely, as I said just now, but stagnation is quite possible. There is one phrase much employed when people talk on these subjects, which, to my mind, contains a fallacy. I mean the common phrase of popularising science. Now, to popularise science is simply impossible. You may give everybody an opportunity of learning, but not everybody will or can take advantage of it. You may popularise the results of science, but that is quite a different matter. As an old saying runs, there is no royal road to mathematics. Anybody could cram up, with the help of an average memory and of easily-acquired handbooks, a summary of what has been done in astronomy, in chemistry or other science, but when that result is accomplished he will be very little nearer to any real gain which science could bring to him. It is only labour and perseverance, added to natural capacity that can give a scientific mind. Fortunately, not everybody is required to have it. I have no doubt a man may be a good workman, a good clerk, a good man of business, and discharge all the duties of life in a satisfactory way, although he believes that the sun goes round the earth and that the moon and stars are lighted up at night to enable mankind to see their way. We cannot all be what the hideous slang of the day describes as "scientists," any more than we can all be poets; but I think the answer was a good one which was given long ago to the objection, "You want to make your pupil Jack of all trades, and master of none." "No," was the reply, "I want him to be Jack of all trades, and master of one." Nobody is required, nor, indeed, is it usually possible to make a serious study of more than one profession; but, just as it is good to have a taste for books, though we may not wish to become authors, and to have a love of pictures, though we may never intend to paint, so it is desirable to have a

sympathetic insight into studies alien from our own. Time is not wasted in that way, for there are very few people a good deal of whose time does not run to waste, and when they talk of want of time, it is really, nine times out of ten want of energy that they mean. No doubt, much labour is monotonous and wearisome, but those who have tried the experiment will tell you that, given a reasonable degree of bodily health and mental activity, the best repose from monotonous labour is to be found in change of occupation, not in absolute apathy and vacancy (Hear, hear.) and there is one reason why, in my judgment, some tincture of scientific knowledge is desirable for every educated person. The result may not be great, but the process is valuable. An entire absence of the scientific spirit is no doubt compatible with brilliant talent and high distinction. You do not find fault for a deficiency of that kind in a novelist a poet, or a writer of light literature, but it is a deficiency notwithstanding. If you ask me what I mean by a scientific spirit, I think I know, but I must confess that it is more easily described in vague and general terms than precisely defined. I mean by it, in the first place, a habit of accuracy and exactness in matters of fact. It matters very little to an orator that his facts should be carefully verified—sometimes he is wise in abstaining from the attempt but a calculation or an experiment must inevitably fail if there is a want of accuracy anywhere. In the next place, I mean that temper of mind which seeks for conclusions, but does not jump at them; which is equally opposed to the stupid incredulity of ignorance, refusing to accept any idea which is not familiar; to the reverential credulity, which accepts as true any statement coming down from old or high authority; and to the careless indifferentism which, so long as a theory looks and sounds well, and especially if it flatters some previously existing feeling or prejudice, does not care on what foundation of reality that theory rests. (Cheers.) Ours is an age when the half-educated are a power in the world; when more men than ever before reason and speculate on difficult matters, and when, consequently, there is all round us and on all subjects a quite bewildering amount of loose talk and inconclusive argument. (Hear, hear.) More than that there are fashions in opinion, and you constantly hear it said, "Oh, yes, that was the way people reasoned 20 years ago, but it is quite out of date now." Well, such fluctuations must exist in what are called practical affairs, but that is all the more reason why it is good to have to do with theories that cannot go out of fashion, and with trains that are absolutely incapable of being affected by the ebb and flow of what is called public opinion. Else we should be apt to rest in the conclusion that nothing is true and nothing false, and that the best thing to do is simply to accept the current ideas of the day, which, indeed, from the point of view of personal interest, very likely for most people is the best thing. That the world is governed by laws which we did not make and cannot abolish—laws which will operate whether we recognise or ignore them, and which it is our wisdom therefore to study that we may obey, and in obeying utilise them—that is what I take to be the outcome of scientific teaching (cheers), and if anybody thinks that a useless or an unimportant or unnecessary lesson I do not agree with him. (Hear, hear.) Something else science, rightly understood, will teach us to know—what it is that we can hope to know and to understand; and to recognise how little that is, and how much lies, and probably always will lie, beyond the reach of our faculties. One word only I will add—that, having known men of many professions, I should say, as far as my observation goes, the happiest lives are those which have been devoted to science. Every step is interesting, and the success of those who do succeed is lasting. What general, what orator, what statesman, what man of letters can hope to leave a memory like that of Darwin? An invalid in health, a man who seldom stirred from home, a man until his later years very little known to the outer world, but who, from his quiet study, revolutionised the thought of Europe, and will be remembered as long as Newton and Bacon. If fame be ever worth working for—I do not say it is—that kind of fame is surely, of all, the most durable and the most desirable. (Cheers.) Well, I have perhaps digressed from our proper subject, for it is not likely that we have a future Darwin in this room, but it is no exaggeration to say that, as a rule, no man who has taken to science as the work of his life regrets the choice, while men who have done important work in other lines feel like Renan, who, at the height of his literary eminence, tells us in his autobiography that he has often regretted that science, rather than historical research, had not been the object of his early pursuit. Nothing remains for me now except to offer to this school of science my sincere good wishes for its future prosperity, and to you, the successful students who are attending here to receive your prizes, my congratulations on the good beginning which you have made, and my hope that neither early success nor possible temporary failure may induce you to desist from those steady, unhasting, unresting exertions without which the great prizes of life can never be attained. (Cheers.)—*Pioneer.* [There is so much that is good in Lord Derby's address that it is the more to be regretted that he should have held up for admiration two men like Darwin and Renan, the first of whom did not think Christianity worthy of the same examination which he instituted regarding the phenomena of the physical world, while the other, most unnecessarily introduced, has devoted his life to destroying the faith which is the light and the hope of the human race, and will remain so when Renan is forgotten.—ED. *T. A.*]

THE COCONUT trade of Tahiti is a growing one. Notwithstanding the destruction of many of the palms by the storm which raged over all the islands of the Pacific last season, and the blight which attacked the fruit there is an immense excess of production over last year's crop with a ready market for the fruit, either fresh or as dried copra.—*Mildura Cultivator.*

THE BENGAL IRON AND STEEL COMPANY are proving what success can be gained by private enterprise in developing the mineral resources of the country. When they took over the concern from the Government of India there were two blast-furnaces on the old-fashioned "open-top" plan. A third and larger blast furnace of better design and with all the recent improvements which can be thought of is now being erected. When this new furnace is completed it is intended to remodel the old ones. The Company are also putting up two new blowing engines and in other respects making the blast-furnace portion of the works equal to meeting modern requirements. The foundry is being extended with a view to the manufacture of cast-iron pipes suitable for waterworks, which are now being so widely carried out in many cities. The management are showing such energy and enterprise that the Government must congratulate themselves on having practically entrusted to the Company the task of developing the native iron industry of India. —*Pioneer.*

IS SULPHUR TO BE FOUND IN CEYLON?

The above query is put to us by a correspondent who tells us he has searched the Import and Export tables given in our Directory for any mention of sulphur in vain. He further adds that as he finds brimstone to have a place in those tables, he conjectures that our import of sulphur is generically included under that heading. If this be not the case, he says, he is at a loss to conceive whence the supply for the local demand for the article is obtained, and he asks us if we can inform him whether there is any local production of it from which this apparently obvious demand can be met.

The only instance known to us personally of sulphur being found in Ceylon is that of the well-known hot wells at Bubula on the Badulla-Batticaloa road. These springs are distinctly sulphurous, the yellow crystals forming in abundance around their edges; but we have never heard whether these are collected, or, if they be, whether they have been so dealt with as to form an article of trade or commerce? Now it is certain that in one form or another sulphur enters largely into the daily uses of civilization. It is one of the main components also of gunpowder, and we fancy, though we do not feel certain on the point—that we have read that in earlier times, before the introduction on a large scale of this explosive from Europe, the natives used to manufacture the coarse powder they employed for themselves. If this was the case, there is every probability that the sulphur required for the preparation was obtained from local sources. Even in regard to India, we learn from our own compilation of "Gold, Gems" &c., that the sources of sulphur are limited in extent and only sufficient to meet local demands. "They are chiefly connected with the occurrence of hot springs." Whether therefore the sulphur now required locally be imported under the head of "brimstone" or not, it is certain that, to some extent at all events, sulphur in its natural state is to be found in Ceylon. As we have said, but one locality is at present known to us where it may be found; but even this solitary instance is a sufficient ground for the assumption that it might be found more widely diffused. Geologists tell us that wherever igneous rocks are to be found, wherever there exists traces of a past volcanic action, sulphur is sure to be more or less present. If this be the case, it is certainly singular that hot mineral springs are not to be found more commonly in Ceylon than is generally known. The knowledge possessed on the subject of local deposits of sulphur seems to be extremely restricted; Tennent scarcely refers to it, and yet the consumption of sulphur in any modern community must be large. Whence then is the supply for our local demand for it met? We have cited proof of its existence in Ceylon, and it might well be that some discussion of the matter would tend towards the creation of an industry concerned with its collection and preparation. Does the residuum found in our salt-collecting pans ever show traces of sulphur? We have always understood that it is more or less present among the impurities of rock salt, but are unaware if it be a constituent in that obtained by the evaporation of sea water. Probably some local scientist would be able to throw light on this part of the subject. The chief source of European supply we believe to be from mines worked in the neighbourhood of Mount Etna in Sicily, an active volcano certain to bring the article to the surface. But it must exist in many other places, and the only question is whether in such localities it is at so great a depth as to be commercially unworkable. The springs at Bubula before referred to at all events bring it in considerable quantities to the upper levels, and those springs are scarcely likely to be the solitary instance to be found in Ceylon.

IRRIGATION AND ARTESIAN WELLS.

The following is a communication from one who has spent some years in the N. C. Province which, since its formation by Sir William Gregory, has shared very largely in the Irrigation vote.

"After the recent experience of the comparative failure of several large Irrigation works lately restored, any sensible man interested in the welfare of the colony, should protest againt the Government undertaking any further expensive works, the success of which depends entirely on rainfall, which, it need hardly be said, often proves to be precarious and disappointing. It is admitted that all the stupendous tanks in the Island were once in splendid working order and had under each of them a teeming population quite happy and contended with their lot. The question is how these tanks fell into disuse, and eventually into dis-repair. Undoubtedly a drought continuing for a series of years was the cause of their ruin and desolation. People who once thought their position happy had to migrate to other parts of the Island where they were provided with an unfailing water-supply; and this was how certain tanks were abandoned, neglected and desolated. Who will now guarantee that, in the case of the tanks recently restored by Government, a like failure and abandonment will not occur. To provide against such a contingency is the imperative duty of a paternal Government; and the only feasible means of effecting this seems to me to be by boring artesian wells to serve as feeders to these tanks. A cheap apparatus for boring purposes can now be had for R3,000, and the cost of sinking a well will be very inconsiderable when compared with the enormous expenditure incurred in the restoration of "giant" tanks. In view of these circumstances, it is to be hoped that the Government will make a start in this direction without delay. An experiment may be made in the case of one of the tanks in the Northern or North-Central Provinces. There is, I believe, a vote of R9,000, allowed in the Supply Bill for 1891, for experiments with regard to Artesian wells.—"Jaffna Patriot."

A PEPPER SHIPMENT.

In the Probate, Divorce, and Admiralty Division, before the Right Hon. the President, Edward Boustead & Co. and Edward Pink & Sons *v.* the Owners of the ship "August" was an important case heard on Saturday, involving points of interest to traders and merchants, more particularly to dealers in Eastern produce. Mr. J. G. Barnes, Q. C., and Mr. F. W. Hollams appeared for the plaintiffs; Sir Walter Phillimore, Dr. Raikes, and Mr. Arthur Pritchard represented the defendants. The statement of claim, which was delivered on February 12th, 1890, set forth that the plaintiffs had suffered damage by breach of the contracts set forth in five bills of lading of goods shipped by or on behalf of the plaintiffs, at Singapore, on board the defendants' sailing-vessel the "August," and consigned to London. The bills of lading were dated May 14th, 1889, and were respectively signed by the master of the said vessel as the agent for the defendants. The non-delivery of 1,094 bags of pepper-part of the cargo shipped in the said vessel, and included in the said bills of lading, was the breach complained of. Alternatively, the plaintiffs alleged that they had suffered damage by the defendants, their servants and agents, wrongfully depriving the plaintiffs of certain goods, to wit, 1,094 bags of pepper delivered to the defendants by or on behalf of the plaintiffs, to be carried in the defendants' vessel the "August," from

Singapore to London. The particulars of the damage were as follows:—1,094 bags of pepper, weighing 70 46 tons. at 6d per lb. arrived value 3,945*l* 15s. The plaintiffs claimed (1) 3,945*l* 15s and interest; (2) alternatively damages. The defence and counterclaim were substantially to the following effect:—The defendants alleged that the plaintiffs were not the owners of the pepper or the holders of bills of lading in respect thereof, and that they were not entitled to maintain this action. The defendants denied that there had been any breach of the contract contained in the bills of lading. They alleged that by the said bills of lading the pepper was to be delivered to the plaintiffs, only unless prevented by certain excepted perils, and that the delivery to the plaintiffs was, in fact, prevented by the said excepted perils. With respect to the alternative claim, the defendants denied that they wrongfully deprived the plaintiffs of the pepper or of any portion thereof, and that even if it was the property of the plaintiffs, it was lawfully and necessarily sold in the interests of, and on behalf of, the plaintiffs, and that the defendants had always been ready and willing to account for the proceeds of sale of the said pepper to the lawful owners thereof, on being paid the money due to them (the defendants) in respect of the freight of the said pepper and other charges in connection with the same. The defendants had paid into court in this action, in respect of the said pepper, on account of the sale thereof, an amount which they stated to be far in excess of any balance due to the plaintiffs. The defendants further pleaded in the alternative that the contract for carriage of the goods was entered into by the master of the defendants' ship as the agent of the charterer of that ship, and that she, being a German vessel and entitled to fly the German flag, was also entitled to all the privileges of a German ship; that the defendants and charterers of the said vessel were German subjects, resident in Germany, and that the master was a subject of that country; that the charter-party was a German contract, and that the contracts contained in the bills of lading were made and entered into subject to German law; that, by that law, the sale of the goods, under the circumstances, at the place where and at the time when they were sold, was lawful and right, and that the defendants incurred no liability by reason of the said sale; that the defendants are, by German law, entitled to receive from the plaintiffs or owners of the said goods or holders of the bills of lading the freight agreed upon and specified, and that the defendants should be entitled to set off the said freight and other charges incurred by them or their agents on and about the said goods against the proceeds of sale of the same in their hands, and that the plaintiffs are only entitled to the excess, if any, of the realised, value of the said goods (if such goods, or any part of them, belonged, in fact, to the plaintiffs) over and above the amount of such freight, together with the charges upon the said goods. The defendants further alleged that they had always been ready and willing to pay over any such excess in value, and that the amount in court was far greater than such excess; and, by way of a counterclaim, the defendants asked that they should be paid for the carriage of the said goods or any part thereof belonging to the plaintiffs; also for charges incurred and disbursements made by them on account of the plaintiffs in respect of the goods; and they claimed to receive from the plaintiffs their due contribution to general average charges on account of the said goods or such portion thereof as belonged to the plaintiffs. In the alternative, the defendants claimed freight and charges on the goods in accordance with the laws of the German Empire, by which, they said, the contract was governed. The defendants further said that, subsequently to the institution of these proceedings, they had ascertained that the amount paid by them into court was 217*l* 4s 8d in excess of all possible claims by the plaintiffs, and they asked repayment of that sum from the plaintiffs, who had received the whole of the sum of 1645*l* paid into court by the defendants. Portions of the damaged cargo were discharged, were surveyed by merchants called in for the purpose, and, upon their recommendation, were sold at Cape Town, as damaged goods, at public auction, for the benefit of whom it might concern. With regard to the pepper, it was contended that, being of the kind known in the trade as Kongpoot pepper, it was almost impervious to damage by sea-water, that the sale was quite unnecessary, and that after immersion in salt water, if it were allowed to dry, by exposure to the air or sun, it would be practically as good as before its immersion. Some considerable portion of the pepper sold at these public sales in Cape Town was, in fact, reshipped to England by the mail steamer "Garth Castle" and "Tartar," the first of such shipments taking place within eight days or so of the first, and on the very day of the second public sale of cargo ex "August." On arrival here it was sold by Messrs. Lewis & Peat of Mincing-lane, and fetched, at public sale, prices for the most part only about a farthing or three-eighths of a penny per pound below full market prices ruling for sound pepper of a similar kind. Of the 240 bags told ex "Garth Castle," 159 bags were classified by the dock samplers as "sound," while of the remainder of that shipment fifty-one bags were catalogued as first class, twenty-three as second class, six as third class, and one as fourth class damaged. Of the 101 bags ex "Tartar," eighty-three were sold as "sound," sixteen as first class, and two as second class damaged. These were sold by the same brokers on November 13th and fetched 5¼d., and 5⅛d., and 5d. per lb. for the three descriptions respectively, the market having fallen between the sale of the previous shipment and the above date. Buyers would be aware that the pepper had been reshipped from the Cape of Good Hope, where no pepper was grown. They would, consequently, suppose that some reason had existed to cause its transhipment, and would bid slightly lower prices in consequence.

Mr. Thomas Cuthbertson, of the firm of Edward Boustead & Co., London, and Boustead & Co., Singapore, was the first witness for the plaintiffs. He stated that he had carried on business at Singapore for a number of years. His firm made the contract for this pepper, cost, freight, and insurance, to Messrs. Edward Pink & Sons, their co-plaintiffs in this action. It was not the same as what is known as Singapore pepper, which was prepared by smoke and heat, and would on that account more readily damage by water. This Kongpoot pepper was sun-cured, and could thus be more easily decorticated and ground into white pepper. Inside the outer husk was a skin which was almost impermeable. The skin, even if the sea-water were to penetrate the husk, would effectually prevent damage to the kernel which was inside it. The sole use for this kind of Kongpoot pepper was for ground white pepper. The "August" brought back about 638 bags of the shipment.

Mr. Thomas Pink said he happened to see samples of the pepper ex "Tartar" and "Garth Castle" not knowing at that time that they had been drawn from the lot shipped in the "August." The samples were perfectly "sound" except those which represented the bags classified as "damaged." He would have bought some of the lots, but that he expected the "August's" shipment to reach his firm about that time or soon after. The pepper would do quite well for making into white pepper, as the outer husk would be removed by the process called "pearling," and the kernel would be ground into white pepper, this being the particular use for Kongpoot pepper.

Mr. William Lee Darling, foreman sampler at the London and St. Katharine Docks, who sampled and classified 101 bags of the pepper ex "Tartar," and Mr. Stockwell, formerly foreman in a similar capaciy at the East India Dock, who sampled and classified the 240 bags ex "Garth Castle," were called to speak to the correctness of the classifications, as was also Mr. William James Barker, inspector of cargoes at the latter dock. Mr. Andrew Devitt, a member of the firm of Lewis & Peat, brokers of Mincing-lane, was also called by the plaintiffs. This witness, in cross-examination by Dr. Raikes, admitted that, in his opinion, sea-water would affect this class of pepper a little, making

it slightly grey in colour. This would, however, hardly apply to "first class damaged." If pepper were repacked it would be classified as third class. Mr. Cuthbertson having been recalled, stated, in answer to Dr. Raikes, that he might have ordered the sale of pepper at Singapore on account of sea damage when acting surveyor of cargo. He did, not however, remember having done so.

The plaintiffs' case having closed, Mr. Otto Mühry, a member of a firm of merchants at Singapore, and now on a visit to this country, was called, and examined by Dr. Raikes, on behalf of the defendants. He had been engaged in the Eastern produce trade for about seventeen years. The "August" was chartered by his firm, and was put up as a general ship, and he remembered her loading. Boustead & Co. loaded the pepper, which was consigned to Edward Boustead & Co., London. The captain had instructions as to what firms he was to apply to in case the "August" should be obliged to put into any ports during the voyage. On August 15th, 1889, witness received a cablegram from Thomson, Watson & Co., Cape Town, the charterers' representatives at that port. The contents of the telegram were communicated, through witness's clerks, to the shippers, who were asked whether they had any instructions regarding the cargo. On August 27 the witness received a second cablegram, which stated that part of the cargo was seriously damaged, and that the surveyors had ordered the same to be sold without delay. This news was also communicated at once to the shippers. On November 4 witness got another cablegram, stating that the expenses of the "August" at the Cape amounted to 2,600*l*. and suggesting that the shippers should be asked to advance that sum, or a portion of it, to avoid a bottomry bond having to be resorted to. Witness sent round a circular to the shippers, who, however, declined to contribute anything towards the expenses. Witness thereupon cabled to Thomson, Watson, & Co., "Shippers decline." In witness's opinion such pepper as that shipped in the "August" is liable to damage by sea-water, but, perhaps, not so much as other goods. He had known cases of sea-damage to pepper, and remembered instances in which pepper had been recommended to be sold.

Sir Robert Phillimore having replied upon the arguments put forward on behalf of the defendants, the President said he would deliver his decision upon this point of the case at an early date; but, in any event, he would like to have translations of those decisions of the German Courts upon which reliance had been placed by the expert.—London *Grocer*.

PLANTING NOTES IN CEYLON FOR 1890.

The year that has just closed has been in most districts an exceptionally favourable one for flushing, and from all I have seen of 7 years old tea, with ordinary cultivation, I think a maximum yield has been secured. If 1891 is an equally mild and genial one, it strikes me, we are safe to see 56 million lb. shipped for the year. Coolies have generally been plentiful, and, with the exception of the wave of influenza, healthy. With so much really light work on tea estates there is not likely to be any great labour difficulty. With the judicious use of *real* Coast advances coolies will be forthcoming for all our needs. I have found more difficulty in regulating my labour force so that there shall be no short time than in actually securing the number required. With high cultivation in the shape of manuring this difficulty would be readily overcome, as tea over 6 years old in old coffee land with good soil and one-third manured yearly is safe to yield 400 lb. per acre per annum. The greater portion of the younger districts show growth equal to an average yield without manure of 500 lb. per acre off all 7 years old tea. Uva generally gives excellent promise, the higher fields showing as fine a growth and style of bush as I have seen anywhere, and much of the lower fields in Haputale that were so doubtful sometime ago will in my opinion be excellent tea yet. All that is necessary here is more care in planting and shading, than what is required at higher and more moist elevations, and patience to wait an extra year or two for results. Good mana and guinea grass land, planted in tea, continues to yield very satisfactorily.

The planting out of timber trees on waste land and along roads has been extensively carried out during the year. For easy and rapid growth, with almost no liability to die off, the grevillea takes the palm, while it appears to do little or no damage to the tea and adds a large quantity of fallen leaves annually to the soil. It would be interesting to know what these fallen leaves contain and give back again in fertilizing matter to the soil. Cedrela toona (red variety) and sapu are excellent for medium elevations, but the latter is fatal to tea if planted amongst it.

TEA AND TOBACCO IN MATALE.

We have got excellent tea crops in Matale—20 per cent over estimates in some cases, and I personally am pleased with the result of the year's working, and yet it has been one of the driest seasons for many years. Dry seasons are however becoming monotonous, and I will welcome a change. It has not been very successful so far, and this season in particular has been very unfavorable for it.

The Tobacco Company Directors hope to do well in tea, cacao and coconuts, and I wish them every success.

THE SCHOOL OF AGRICULTURE.

The school opened, in 1890 with the full complement of students, classes and castes being well represented. Mr. Jayawardene, who succeeded Mr. Lewis as headmaster continued to instruct the boys in practical work, as he had been doing since the foundation of the school; Messrs. de Silva and Rodrigo (acting for Mr. J. S. de Saram) being the other assistants. Under the supervision of the practical instructor a variety of crops were raised on the grounds attached to the school, such as paddy, cotton, dhall, Indian, corn, arrowroot, sugarcane, yams, beans, and other vegetables. The object of such cultivation is mainly to demonstrate to the students the best methods of growing these crops so that they may help to introduce or extend their cultivation in the rural districts, in place of less nutritious food products. The headmaster has also done much towards showing the boys the best methods of housing and feeding cattle kept for dairy purposes, while he has no doubt proved that the milk trade is not to be despised when properly set about, with a view to profit. The superintendent has endeavoured to make their agricultural studies as interesting as possible to the boys by the formation of classes in elementary geology, zoology, entomology, veterinary, and field surveying in so far as these services bear on agriculture, and it is satisfactory to note how much the students appreciate the instruction in these branches, and strive to excel in a knowledge of them. The boys taken generally were a very satisfactory lot last year, and among them were some of special ability, notably J. A. Kodippily among the seniors and E. Johannes among the juniors. The agricultural instructors in various parts of the island have reached the number of thirteen; of these seven are paid by Government and six privately. It is gratifying to find that the managers of the Prince of Wales's College have introduced agriculture into their curriculum, and that a large number of students attend the class. The Buddhist community have also started agricultural teaching in their school at Hatton. In both cases passed students of the school of agriculture have been chosen an instructors. Such private and voluntary efforts are most praiseworthy, and the benefits arising from them must be very great. It is satisfactory to find that a good few of the old boys of the school have started cultivation on their own account—some on a tolerably extensive scale. To make the work still further attractive excursions to Botanical Gardens, plantations, manufactories and other places of interest are periodically made. The school also has its own reading-room, museum discussion society and magazine. Looked at from an unprejudiced point of view, and with an intimate

knowledge of the results of agricultural teaching at the school, it cannot be doubted that the institution has fulfilled the object for which it was founded, and that its influence is slowly permeating the classes it was intended to reach. Granted that officialdom seconds the efforts of agricultural officers (and so far it is a matter of congratulation that much valuable help has been derived from that source) and that the rulers of the people persist in their endeavour to ameliorate the condition of the native agriculturist, and the work initiated by Mr. H. W. Green, late Director of Public Instruction, will be a source of much material benefit and happiness to the poor cultivators in Ceylon.

OUR FOREST DEPARTMENT.

The policy of the department has been to subordinate all other work as much as possible to the work of selecting and demarcating our future forest reserves. The Survey Department was busy during last year surveying blocks of forest selected by the forest officers. In the Western Province, in the neighbourhood of Mirigama some three or four thousand acres of forest have been surveyed for Railway Forest Reserves and the werk is not yet furnished. Two large forests of about 3,000 acres and 2,000 acres have been surveyed in the Kalutara district. For the Colombo district two forests of about 1,500 and 1,000 acres respectively are being "settled" by Mr. Mantell. There are one or two other small forests ready for settlement.

The other provinces in which reserved forests have been selected and are either proclaimed or are in process of settlement are the Central, the Southern, the North-Western and Saharagamuwa.

The difficulty now is the appointment of a suitable Forest Settlement officer: different officers have been appointed from time to time but the work done by them has been as a rule very unsatisfactory. So far Mr. Mantell appears to have been the only one who understood the duties and took a real interest in them. It is the intention of Government, we believe, to appoint some civil servant as permanent Forest Settlement officer for the island. A R7,200 man will be appointed and he will get R10 per day commuted travelling allowance so that the appointment will be a good one. But one Forest Settlement Officer will not be enough. He could only "settle" 6 to 12 forests a year and at that rate a generation will pass before the Forest Department has its full extent of reserved forests. It would be very much better if Government were to appoint the different Chief Surveyors as Forest Settlement officers, each for his own province. They are far and away the best public officers outside the Forest Department for the work.

A good deal of timber and firewood was supplied to public departments during last year. In the Western Province however it has been found that the extent of forest land and the supplies of timber in private hands is so great that it is not worth the while of the Forest Department to compete with local traders. For the next few years the department will only supply public departments in the Western Province with timber that cannot be obtained from tenders or that may be urgently required. This however, applies only to locally felled timber. The Central Timber Depôt in Colombo will be kept up and will be stocked with satinwood, halmilla, milla, palu and other woods from other provinces. At present the Central Depôt is located on the Harbour Works Yard in Galle Buck, but the Forest Department is to take over from the Colonial Storekeeper in the course of the present year the land called "Beira" which juts into the lake between the Pettah and Fort railway stations. This will be a splendid site for a depot, and it is proposed to improve it by reclamation from the lake and by the construction of a railway siding, timber sheds, saw mills, &c.

During the past year timber depôts were opened at Kelaniya on the banks of the Kelaniganga, and Kalutara on the banks of the Kaluganga and at Alutgama on the banks of the Bentota river. The work of stocking them will be commenced this year.

The work of checking the transit of timber on the Kelaniganga, the Kaluganga and the Bentota rivers was fully organized last year. Two superintendents and 10 river watchers were appointed. The illicit removal of timber is now almost stopped.

The felling of ebony has, we believe, been restricted throughout the island owing to the low price.

LONDON AND COLOMBO PRICES OF CEYLON TEA.

The average prices for our Ceylon tea in the London and local markets has been well maintained, as may be judged from the following:—

CEYLON TEA IN MINCING LANE.

Average	rate realized	1885	..	..	1/2d
Do	do	1886	..	..	1/1d
Do	do	1887	..	..	1/1d*
Do	do	1888	..	..	11¼d
Do	do	1889	..	..	11d
Do	do	1890	..	..	11d

LONDON AND COLOMBO TEA PRICES.

The weekly averages for London and Colombo sales are in the first two columns as follows, (in the third column we add the ruling quotation for Standard Fair Pekoe Souchong):—

	Reuter's d.	(Colombo.) cents	G., W. & S. d.
Jan. 9th	11¾	44	10¼
" 16th	11½	44	10¼
" 23rd	11½	43	10
" 30th	11¼	43	9¾
Feb. 6th	11	42	9¾
" 13th	10¾	42	9¾
" 20th	10½	41	9½
" 27th	10½	41	9¼
Mar. 6th	10	41	8¾
" 13th	10	41	9
" 20th	10	42	9
" 27th	10¼	42	9
Apr. 3rd	†10½	42	9
" 10th	10¼	42	8¾
" 17th	10¼	40	8¾
" 24th	10¼	40	8¾
May 1st	10	39	8½
" 8th	10	39	8¼
" 15th	10½	42	8¼
" 22nd	10½	42	8¼
" 29th	10½	44	(Holidays)
June 5th	10¼	44	8½
" 12th	10½	46	8¾
" 19th	11	46	9
" 26th	10¾	46	9
July 3rd	10¾	46	9
" 10th	10¼	43	8¾
" 17th	10	43	8¾
" 24th	10½	36	8¾
" 31st	10¼	36	8½
Aug. 7th	10¼	39	8½
" 14th	10¼	39	8½
" 21st	10¼	40	8½
" 28th	10½	40	8½
Sept. 4th	10¾	41	8¾
" 11th	11	41	9¼
" 18th	11¾	42	9¾
" 25th	1/	42	10
Oct. 2nd	1/	46	10
" 9th	/11¾	46	10
" 16th	11¼	42	9¾
" 23rd	11½	42	9½
" 30th	11¾	42	9½
Nov. 6th	11¾	42	9½
" 13th	11¾	41	9½
" 20th	11¼	41	9¼
" 27th	11¼	42	9
Dec. 4th	11¼	42	9
" 11th	11	40	8¾
" 18th	10¾	40	8¾
" 25th	(Holidays)		(Holidays)

A TUSK OF IVORY.

MR. HERBERT WARD, IN "SCRIBNER'S MAGAZINE."

Silent, and almost motionless, quite hidden in the darkness, stood the huge form of an old bull elephant, one of whose tusks had been damaged in his youth and had become totally decayed. His head was bent forward in order to rest his one monster tusk upon the ground, his trunk, loosely coiled between his fore-legs, was also resting on the ground, and his great ragged ears flapped spasmodically in vain endeavours to shake off the myriads of mosquitoes that persistently hovered around his head. Suddenly the forest was lit up by a most vivid flash of lightning, followed an instant afterwards by a crashing peal of thunder. The elephant raised his head with a startled jerk, his huge limbs shaking with fear. Almost before the rumbling, echoes of the thunder had died away, the rain, that had been threatening for so many hours, fell in torrents. Flashes of lightning succeeded each other so rapidly that the attendant peals of thunder were converted into one continuous roar, and the violence of the wind soon increased to a veritable tornado—a tropical hurricane. Trees were blown down and uprooted on all sides of the terrified elephant, who remained for some time motionless with fear, but, as the tempest continued, the monster became suddenly panic-stricken, and charged madly through the denso forest, stumbling and falling over the trunks of uprooted trees in his endeavours to gain some open patch where there would be no danger of being crushed by the falling timber. The lurid flashes of lightning revealed the frightened animal with coiled trunk and head bent low, blindly smashing a way through the dense woods. Suddenly, in the midst of a mad rush, the elephant sank to the ground with a sharp squeal of pain. The poor brute had severed the vines that supported one of the traps that had been arranged the previous day, and a heavily weighted spear was plunged between his shoulders. For some moments the wounded animal remained motionless, then the great body rolled slowly from side to side in vain endeavour to free himself from the spear, but the weapon was barbed and the points had penetrated too deeply to be shaken off. After many efforts the animal at last got on his legs again and staggered a short distance through the forest until, growing rapidly weaker from loss of blood, he stopped to rest and leaned the weight of his body against a large ant-hill, breathing heavily and groaning deeply in agony. Here he remained, exhausted, until daybreak, his hide covered with patches of mud and deep red smears of blood. Gradually the rain ceased, and the wind died away. With the first glimpse of dawn in the village, there was creaking from the small square cane doors of the huts, as they were removed one by one, and dark, manly figures, with long spears in their hands, stepped forth and stretched themselves, after their night's heavy sleep.

After hastily arranging their scanty loin-cloths of beaten bark, the men all started into the dark woods to see if any elephant had been wounded by the traps. The party entered the forest in single file, but soon divided into small companies and set off in different directions. Ioko took an entirely different route from the others, and when about two miles from the village he halted suddenly, snapped his fingers, and placed his hand over his open mouth saying to himself in a low tone: "Look at this elephant track! See what a path is here!" He followed the trail for some time, until within view of the trap he had set the previous day, when his excitement became intense, for he found the spear was gone, and the grass and leaves beneath the snare were covered with blood. Without hesitation, he followed the blood-stained tracks, until he approached the great ant-hill, near which he stopped a moment to extract a thorn from his foot. He was startled by a deep groan, and, cautiously stepping forward, he saw his prey leaning its unwieldy form against the mound. "Lo-o-o! It is the evil one, Litoi Linene!" (Big Ears) gasped Ioko to himself excitedly. Silently watching the animal, to decide in his own mind upon the best mode of spearing him in a vital part, he firmly gripped his heavy spear, the shaft of which was fully eight feet long, and stepped softly forward until within reach of the left shoulder of the unconscious animal. With steady nerve he poised his weapon, and with a mighty plunge drove the keenbladed spear deep into the elephant's heart, and sprang away among the trees. With a shrill, trumpeting cry of pain, Litoi Linene staggered to his feet, swayed forward quivered, and fell to the ground lifeless. Ioko after waiting a few moments to satisfy himself that the animal was dead, calmly stepped fourth and raised a cry that echoed through the woods, and which soon brought several of his companions to the spot. Without any further sign of excitement he quietly busied himself in cutting his barbed spear from the carcass. He then examined the one large tusk and the decayed stump of its fellow, remarking to his companions, who were now arriving: "Now the evil spirit is dead. Litoi Linene will lead no more devilish elephants to our plantations."

In a very short time the scene became indescribable. Excited men with sharp knives commenced cutting lumps of meat from the still warm carcass, and throwing them to the eager women and children, who crowded around the baskets, quarelling like wild animals over the possession of each piece of flesh that was thrown among them. The savages' hearts were filled with joy at the prospect of a huge feast. That night, under cover of the darkness, Ioko, all alone, buried the one heavy tusk of Litoi Linene in a swamp far from the village, so that only he himself knew of the place of concealment. He hid the tusk according to the tribal custom, for in the Aruwimi districts the people of neighbouring villages are seldom good friends, and they all have a habit of attacking each other at odd times in order to capture men, women, and children for cannibal purposes. As tusks of ivory have an acknowledged value, equal to that of a human being, it is customary for the members of each village to conceal in the forests as many tusks as they can obtain, so that they may be in a position to redeem, if permitted, any of their companions who may be unfortunate enough to fall into the hands of their hostile neighbours.—*Public Opinion.*

RETURNS FROM THE INDIAN MINES.

As the present year of grace approaches its close investors are naturally on the *qui vive* for information upon which to base their divided calculations—where there is any possibility of such a happy termination of the twelvemonth's operations. It will not be out of place, therefore, if we give some particulars with reference to the production of gold from the three leading Indian mines. We do so with the greatest pleasure as the properties are yielding well up to the expectations we have often expressed, even when the gold mining industry of Southern India was at such a low ebb that Mysore shareholders flung away their holdings at 3s. or 4s. each; and intelligent and enterprising men like the late Sir William Abbott; to say nothing of the Messrs. Taylor, Sir Charles Tennant, and other believers in the value of the Mysore Goldfield, were regarded by many people as misguided and sanguine visionaries,

Last year, as was shown in an article which appeared in the *Financial News* on October 18 last, the Mysore Company paid dividends of 75 per cent. from actual mining operations, and 50 per cent. from the sale of a portion of the property to the Champion Reef Company, and there is every reason to expect that this year, without any assistance from a subsidiary venture, the Mysore dividends will reach the very satisfactory figure of 100 per cent. The Nundydroog Company has already paid nearly 14 per cent. on account of the present year, and will probably pay double that payment when the full accounts of the year come to be dealt with; and the third property of the trio, Ooregum, although unable to declare a dividend until the House of Lords decides whether or not the issue of the Preference shares was *ultra vires*, has unquestionably placed the Company in possession of a handsome balance of profit for division when it can be legally done. The trio are thus doing so well that we think those who hold shares in the undertakings would act very unwisely in parting with their holdings at anything like the prices now ruling. For these mines at all events, the days of doubt and uncertainty have passed, and their success cannot but be an incentive to greater exertions on the part of the managers of the other Indian properties, and to renewed confidence on the part of those whose hopes have been so long deferred. However, our present purpose is to analyse the returns of the three really successful properties.

It is worthy of note, in the first place, that last month's yield of gold from the Mysore Mine—5,250 oz.—was the best on record, showing that as the property is opened out in depth and in width its productiveness steadily increases. We should be exceedingly sorry to under-estimate by one iota the services which Captain Plummer rendered to the Mysore Company, and, indeed, to the district generally; but at the same time it would be equally unjust to dispute the fact that his successor occupying a difficult position in following such an expert, has well deserved the golden opinions which his management has won. Some months ago the influenza and its after effects caused a falling-off in the returns, and it was concluded by some pessimists that with Captain Plummer the glory of Mysore had departed. That this conclusion was an inaccurate one is now manifest. In the following table the crushings month by month since the end of 1888 are given, from which the shareholders will see at a glance what progress has been made:—

	1890.			1889.	
	Tons.	Oz.		Tons.	Oz.
January ...	3,271	5,003	...	2,066	2,376
February ...	3,000	5,884	...	2,023	3,038
March ...	3,200	5,884	...	2,459	3,249
April ...	3,661	4,571	...	2,600	3,249
May ...	3,385	4.263	...	2,672	3,872
June ...	3,491	4,461	...	2,866	4,275
July ...	3,207	4,174	...	2,947	4,527
August ...	3,138	4,118	...	2,900	4,739
September...	3,100	4,258	...	2,942	4,879
October ...	3,009	5,014	...	3,030	4,424
November...	3,100	5,250	...	3,040	5,157
December ...	—	—	...	3,021	4,829
	35,564	52,865		32,566	49,234

The average yield during the past eleven months has been just under 1½ oz. of gold to the ton of quartz, comparing with a trifle over that percentage for the whole of last year. Last month's average was, however, very nearly 1 oz. 14 dwt. per ton, showing a distinct improvement on the aggregate percentages which we have just mentioned. For the eleven months of the current year it will be seen that the gold produced has exceeded by 3,631 oz. the total production of last year, when, as we have said, 75 per cent. was paid to the shareholders out of the working profits.

Turning, in the next place, to the Ooregum Mine, the table given below shows that the monthly crushings have augmented in a very satisfactory manner, the eleven months' production exhibiting an increase of nearly 50 per cent. over the whole of last year:—

	1890.			1889.	
	Tons.	Oz.		Tons.	Oz.
January ...	825	1,784	...	454	839
February ...	957	2,032	...	482	927
March ...	1,0[illegible]5	2 075	...	508	1,032
April ...	966	2,049	...	5[illegible]5	1,225
May ...	1,004	2,107	...	626	1,353
June ...	1,010	2,127	...	691	1,427
July ...	1,022	2,161	...	714	1,467
August ...	1,110	2,306	...	745	1,506
September ...	1,173	2,491	...	729	1,563
October ...	1,247	2,646	...	756	1,620
November ...	1,297	2,725	...	772	1,662
December ...	—	—	...	777	1,683
	11016	24,503		7,639	16,434

The percentage of the gold produced has been practically the same this year as last—2 oz. 2 dwt. to the ton of quartz, and that was almost precisely the result of last month's crushing. The average is an exceedingly good one, especially in view of the steady increase in the amount of mineral crushed, and the Nundydroog returns are, relatively, even more satisfactory, as will be observed from the subjoined table:—

	1890.			1889.	
	Tons.	Oz.		Tons.	Oz.
January	670	1,139	...	370	581
February... ...	700	1,321	...	280	394
March	650	117	...	300	514
April	650	986	...	300	485
May	700	1,085	...	300	520
June	750	1,400	...	300	498
July	800	1,488	...	300	497
August	900	1,418	...	310	491
September ...	875	1,421	...	339	324
October	900	1,478	...	320	363
November ...	925	1,475	...	312	700
December ...	—	—	...	350	751
	8,520	14,228	...	3,781	6,118

Here we see that the yield of the precious metal for the past eleven months has exceeded by 8,110 oz., or about 130 per cent., the total production for the whole of last year; and whereas the percentage last year was a little over 1 oz. 12 dwt. of gold per ton of quartz, the percentage this year has been about 1 oz. 13½ dwt.—also a very satisfactory average. Results such as these cannot fail to be gratifying to those who are interested in the Companies. They show that the Champion Reef of the Colar district is highly auriferous, and that with systematic and competent management, such as these mines undoubtedly have, permanently valuable returns are tolerably certain, and they suggest also that, whatever may be the fate of the lag-behinds among the Indian properties, the Mysore trio promise to give a very good account of themselves for some time to come.—*Financial News*, Dec. 15th.

COFFEE PLANTING.

TO THE EDITOR OF THE "MADRAS TIMES."

Sir,—If you will allow me the space, I should be glad, as a novice in Coffee Planting, to obtain opinions from some of your readers. Men of experience, will I hope, not consider me on certain details unduly sceptical, I would, in the first place, ask why forest land, independent of good lays, is invariably preferred to grass lands in the hollows of valleys. The best permanent soil is to be found in such positions in India

as elsewhere, probably. Forest land in this country requires manure for coffee, yet apparently for a quicker start men prefer steep slopes. The land after clearing must from its position and in a climate of great heat and heavy rains, quickly deteriorate. On the other hand, levels can be forked without loss of soil, the process alone without manure being a continuous improvement.

Drainage of course is necessary, as with nearly all other cultivation.

Moreover the hill sides seem most difficult to protect from winds, necessitating what would appear a severe and wasteful topping. From the consequent excessive growth of wood and succours in so small a limit, pruning has to be rigorously attended to. An art that even few English gardeners understand.

The next question is as to the best distance to plant. Irrespective of the size of a healthy bush, it may be asked why 6 into 6 is advocated with a plant having such immense and exhaustive lateral roots. The only answer I could ever obtain was, that by covering the ground, weeding is saved. This seems a doubtful argument with labour at 5 annas the day; crop at £100 the ton. Again with the casual labour of India compared with the skilled of Europe is it reasonable to expect satisfactory profits from such large plantations, as appears to be the correct idea? To properly cultivate 100 acres of fruit trees, 1,200, even 1,500 in some cases, to the acre, is no casual work. Some able men succeed, but it is safer to ask the cause of ninety-nine failures, than to be told, as is too often the case, of one success.

If men of experience could have begun with what they know now, would they or not have sought out the sheltered hollows of valleys, planting their coffee in small fields with ample space between each bush, say at 9 into 9 and topping at 6 feet, where grass lands would admit manure on the spot and irrigation available? What secures good crops in coffee, the writer knows not; but it is certain that in Europe fruit trees best succeed by regular surface digging and top manuring, thereby enticing the lateral roots towards the surface. It is stated that there is no gain from topping high, as the lower branches die; but is this really so if the bush is well nourished and has sufficient room for light and air?

Shade is now advocated. Is it an advantage where irrigation is available, or is it only a help in the event of showers failing to give sufficient moisture to lateral roots when the blossom is out? L. C.

TEA IN AMBAGAMUWA giving 450 lb. all round per acre at five years old, and planted on patana and scrub land, must be considered very good, and shut the mouths of critics who speak of the district never bearing more than 300 lb. all over. One of the largest places in lower Ambagamuwa has, we hear, exceeded the estimate by over 10,000 lb. of tea giving 400 lb. an acre for young and old fields all over.

DARJEELING.—Simply delightful weather here for those who are left in the "Holy Spot," and barring a few cases of mild chilblains, I know of nobody who is either sick or sorry after the Christmas festivities. The tea drier controversy in your columns, I confess, is a little over my head, but I certainly think Mr. Davidson has the best of it. I know as a fact, that one of his driers in this district was tinkered at by an amateur *ka wallah*, of cou s with a view to improving it, and equally of course, with the result of very much lessening its drying capabilities. *Verb. sap. sat.* I have heard great things of the Blackman air propeller, as used in this district on one garden, which almost always tops the list in the London market, and hope to be able to tell your readers all about it when the next manufacturing season comes round. So far as I can hear and see, cold weather work in this neighbourhood is well in hand, and I have heard nothing in the way of complaints as to labour being in any way short.—*Indian Planters' Gazette.*

ECHOES OF SCIENCE.

MM. Fremy and Verneuil have presented another paper to the Académie des Sciences, Paris, on an improved method of manufacturing rubies. Instead of employing pure aluminia, they now use chromated alumina, alkalised with carbonate of potash, which does not impair the purity of the crystals, while faciliating their formation and embracing the beauty of their colour. Other improvements have been introduced, especially in lengthening the time of the reaction to a week or more, thus engendering hard, rhombohedral crystals of a large size. A gas furnace is used in place of a coke one, and thus a constant temperature of 1,300 deg. C. can be maintained for weeks. Large crucibles, giving more than three kilogrammes of rubies at one operation, are now adopted. MM. Appert, the well-known glass-bowlers, have allowed the investigators to make use of their furnaces, and they have thus been able to prepare rubies which are in part sapphires or crystals, red on one side and blue on the other a phenomenon sometimes found in nature. The same charge will also produce crystals entirely red, and others wholly blue, perhaps owing to a difference in the oxidation of the chromium.

Can these crystals, which are large as natural stones be used for jewellery and in clockwork? Practice alone can answer this question, but M. Taub has submitted them to a lapidary, who found their hardness comparable to that of the ordinary ruby. The experiments may now be considered to have reached the industrial stage.

On the right bank of the River Lunain (Seine-et-Marne) there are beds of sand which, according to a recent discovery, served to polish the flint weapons of the Neolithic men in that part of France. M. Armand Vire has found no less than ten *ateliers* of the new stone age in this district. Most of these primæval work shops are situated on the hills along the rivers, and not in the valley itself. Probably it was safer in those days to work under cover of the forest than beside the stream, although the polishing sand had to be transported with some labour.

Gutta percha derives its name from the Malayan words, *gueta* a gum, and *pertcha* a cloth, and was introduced to the civilised world in 1842, by Dr. Montgomery, a Scotch surgeon. The first specimens were brought to London from Singapore by José Almeida, and the properties of the gum were announced by Hancock, Wheatstone, and Faraday. The last two physicists recognised its fitness as an insulator of wires conveying electricity, and it was so employed in the first submarine cable, laid by Mr. C. V. Walker, in the Channel, and subsequently in that laid between Dover and Calais in 1851, and in the Transatlantic cables.

The only guttapercha suitable for insulating cables is obtained from the species *Isonandra*, inhabiting the Malay Archipelago, and during the last forty years the trees have nearly been exterminated by the natives recklessly cutting down the second growth. The original variety, the *Isonandra Gutta* of Hooker is now only found on the Chasseriau Estate in the old forest of Boukett Tunah (Hill of Tin), situated in the middle of Singapore. Other representatives of the species are also becoming scarce, and the gums of the African *Bassia Parkii*, the Guianan *Mimusops Balata*, and the *Payena Leerii* are very inferior substitutes. Fortunately the Dutch have taken up the culture of the plant in Java with success; but it would be well if serious attention were turned to its propagation in Singapore, its native habitat. Gutta percha farming is likely to be profitable,

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A tree recently discovered in, tee Sequoia National Park was 41⅓ feet in diameter. 250 feet high, and had 6,126 annual rings of growth.

The motto the Brazilians had stamped upon. their new 20 rs. broze coin is "Vintem popuado, vintem ganho,"—a cent saved is a cent earned.—*American Grocer.*

THE PREVENTION OF LEAF DISEASE IN COFFEE.

TO THE EDITOR OF THE "MADRAS TIMES."

Sir,—Some of your planting readers might be disposed to try whether the immersion of coffee seed in hot water previous to sowing would have the effect of preventing partly, or altogether, leaf disease. The idea was suggested to me by reading part of an article, of which the enclosed * is an extract in the London *Standard*, and I also enclose an extract † from Stephen's Book of the Farm, shewing how seed was pickled to prevent smut in barley, wheat and oats.

Some weeks ago, I steeped 2 lots of coffee seed in hot water of 120 and 130 degrees Fahrenheit, respectively, for 5 minutes, after soaking it in cold water for 15 hours previously. It was quite soft and was sown immediately. It has come up strong and vigorous, and I am making nurseries with the seedlings. Next year, if I am spared, I shall steep some in still hotter water, say 135 degrees, as the cold moisture in the seed after soaking in cold water cools the water considerably.

S. E. Wynaad, 19th July 1890. T. M.

Enclosures.

* Extract from *Standard* of November 6th, 1888.

Home and Foreign Agriculture.

Farmers who have not finished sowing their wheat may with advantage study the results of some important experiments in the prevention of bunt and smut carried out by Mr. Jansen, of Copenhagen, and recorded in the new number of the Royal Agricultural Society's Journal Mr. Jansen has found by repeated trials that both the fungoid diseases referred to can be prevented by immersing the seeds of wheat, barley or oats in water of the temperature of 127 to 135 degrees, Fahrenheit. In the case of wheat and oats immersion for 5 minutes, without previous soaking suffices, but the husk of barley adheres so tightly that it is necessary to soak the grain in cold water for about 12 hours, and afterwards to place it in hot water for 5 minutes.

It is important to observe that a temperature of 135 degrees is the extreme allowable with safety. This prevention is recommended for wheat instead of the ordinary plan of dressing the seed with sulphate of copper or other chemical preparation, because we are told the latter treatment is injurious to the grain and the crop grown from it.

Sulphate of copper in the quantities generally used, Mr. Jansen says, destroys not only the fungus but from 3 to 10 per cent of the seed corn; whereas water, at the temperature mentioned above is harmless to the grain, though destructive to the fungus, nor is this all, for the experimenter finds that the vitality of the plants not killed is impaired by sulphate of copper so that their average weight in autumn is diminished. This year he found that the yield of wheat in plots sown with heat disinfected seed was 30 per cent. more in grain and 23 per cent. more in straw than that of plots sown with grain dressed with the chemical preparation.

† Extract from Stephens' Book of the Farm, Vol. 1. Para 2307.

Seed wheat should be pickled, that is subjected to preparation in a certain kind of liquor, before it is sown, in order to insure it against the attack of a fungal disease in the ensuing summer called smut, which renders the crop comparatively worthless. Some farmers affect to despise this precaution, as originating in an unfounded reliance on an imaginary specific: but the existence of smut, and its baneful effect upon the wheat crop, are no imaginary evils; and when experience has proved, in numberless instances, that steeped grain prevents the appearance of this serious disease, the small trouble which pickling imposes may surely be undertaken rather than place the entire crop in jeopardy. Why pickling the seed should have the effect of preventing the smut in the crop is a question more easily asked than answered: and it is perhaps because it has never received a satisfactory answer that pickling is disregarded by some farmers. No valid objection can be stated against the practice, for the palpable fact stands obvious to conviction, that one field sown with pickled wheat, and otherwise managed in the usual way, will escape the smut, while the adjoining one managed in exactly a similar manner, but sown with wheat in its ordinary state, will be almost destroyed with the disease.

I have seen such a case tested by two neighbouring farmers, the Messrs. Fenton, late tenants of Nevay and Eassie, in Forfarshire. It is true that on some farms, wheat sown in its usual state, escapes the disease, which I have heard the late Mr. Oliver, Lochend, near Edinburgh, state was the case on his farm; and it is also true that pickling does not entirely prevent the occurrence of the disease on other farms; but such cases do not prove that every farm must also be free of smut, indeed no one, beforehand, can aver that any farm shall be so, and while so much uncertainty exists, the safer practice will be to pickle the seed, the expense being a mere trifle.

It is now an ascertained fact that vaccination will not insure immunity from small pox, yet it certainly very much modifies its attack, when it does occur, and precisely so is the case with pickling wheat.

[There is no harm in trying experiments, but the misery of it is that plants, the most healthy and robust as they spring from the ground, get at once infected, if leaf disease is in the locality or country.—Ed. *T. A.*]

The Foochow native paper states that the tea trade in Formosa this year, has been very brisk, and that the Douglas Company had three steamers carrying the tea.—*China Mail.*

Sulphurous Acid is now being used to act upon starch under pressure and at a high temperature. The product, after neutralisation, is Schumann's universal gum, which is soluble and extremely adhesive, and closely resembles gum arabic, which is now very scarce and dear.—*India-Rubber and Gutta Percha Journal*, Dec. 8th.

New Zealand Flax.—Says the *New Zealand Herald*:—"The import of New Zaland flax into the United States under the McKinley tariff should give this industry a fillip, and lead to its more extensive introduction for manufacturing purposes into the Great Republic. Captain Webb (of Arnold, Cheney and Co.) states that the duty formerly charged was 25 dollars, or £5 per ton which was a pretty heavy impost.

A New Industry has sprung up in Germany with young leaves of the strawberry. These are taken, carefully dried and used instead of Chinese tea. They are said to give a decoction nearly approaching that of tea in flavor, and having the same refreshing influence. In many parts of England the leaves of the raspberry, hedge bramble and of the sage are commonly taken as a substitute for tea. The Chinese use the common sage very largely in flavoring tea for their own use.—*Mildura Cultivator.*

A Botanical Discovery.—A very important discovery is reported from Goa, writes a correspondent. For what can be gathered from a pamphlet issued by Mr. B. F. da Costa, a gentleman well-known in Portuguese scientific circles, he claims to have discovered in the milk of *Nivol-Cantem* (*Euphorbia nerlifolia*) an admirable substitute for gutta-percha. The plant is abundant, and grows wild in the Concan districts, generally used for hedges. Mr. da Costa in describing its qualities, says that it is insoluble in water, it softens under heat, and hardens in the cold. It receives and retains a given moulded shape, can be cast into very thin sheets, and is capable of receiving the minutest impressions on its surface. It is liable to become sticky, if exposed to the sun. In its dried state, it is of a chocolate colour. In fact, it has all the properties of gutta-percha. —*Pioneer*, January 2nd.

COMPARATIVE CONSUMPTION OF TEA FROM DIFFERENT SOURCES IN BRITAIN.

The figures afforded by Messrs. Gow, Wilson & Stanton are strikingly illustrative of the extraordinary revolution which the tea trado in Britain has undergone between 1878 and 1890. In the former year Indian tea had commenced to be a formidable competitor with China, the proportions consumed by British tea drinkers having been 23 per cent of Indian to 77 of China. Ceylon did not shew even 1 per cent until 1884, when the proportions had become:—China 63 per cent; Indian 36 and Ceylon 1. In 1887, Indian with 45 per cent and Ceylon with 6 per cent, became, for the first time, unitedly in advance of China: 51 per cent against 49. In 1889 Indian by itself took first place with 52 per cent, and retained this position in 1890. Meantime Ceylon had risen, by leaps and bounds to 18 per cent, while China had receded to 30 per cent, in the market in which she was once supreme. In the next few years the competition will be mainly between the mature giant of India and the young giant of Ceylon, the aged genius who presides over the product of the flowery land sinking gradually, we feel pretty certain, into decrepitude and decay. While India is now, after passing the limit of 100,000,000 lb., making but slight annual advances, Ceylon is increasing her output at a rate which in less than a decade is likely to see her exports, which were inappreciable in 1883, up to the round 100,000,000 of pounds, with India probably at 140,000,000 and China a vanishing quantity of perhaps 10,000,000. The figures for deliveries, (for export and consumption), in the season ended May 1890, were:—

Indian tea	101,000,000 lb.
Ceylon ,, ...	32,000,000 ,,
Java ,, ...	3,280,000 ,,
China ,, ...	87,652,000 ,,

More than one-third of the latter was for export.—The import of Indian tea in October 1890 was so high as 15,237,000 lb., with deliveries equal to 9,822,000. Of Ceylon the highest import was 5,142,000 in July, the highest figure for deliveries being 3,960,000 in September. But in May 1889 the deliveries had exceeded 5 millions by 19,890 lb. The rapid rate, indeed, at which Ceylon is gaining on India and distancing China, is the special feature of the really revolutionary returns which reveal the recent history of the tea trade. In looking at the figures for import of Ceylon tea into Britain, we must not forget that our exports direct to Australia now exceed 2½ millions of pounds, while to other colonies and foreign countries we send more than a further half million. The actual distribution of our 1890 crop was:—

To Britain ..	42,828,743 lb.
,, Australia ..	2,552,861 ,,
,, other countries..	561,865 ,,

NOTES ON PRODUCE AND FINANCE.

(From the *H. and C. Mail*, Dec. 26th.)

REGULATION OF THE SUPPLIES.—We understand that at a meeting of Indian Tea Brokers, held this week, it was resolved that endeavours should be made to regulate the quantity of Indian tea offered at auction in January to 35,000 packages per week, and in February to 30,000 packages, after which a further meeting is to be held to consider the matter.

INDIAN TEA IN FRANCE.—We learn that the Indian Tea Districts' Association have submitted to the Trade and Treaties Committee of the Board of Trade a special report upon the desirability of obtaining a reduction in the rate of duty levied upon tea entering France. A simultaneous effort will be made through

the London Chamber of Commerce to get the industry better terms in connection with the revision of the French Customs Tariff.

INDIAN AND CEYLON TEA IN AMERICA.—They are selling inferior China tea, some of it re-shipped from London in the United States as "English Breakfast Tea," and obtaining a high price for it. Americans who have been in England lately know something about the merits of Indian and Ceylon Tea; and on their return these visitors to Europe express their opinion rather freely upon the China and Japan tea offered them at many American hotels. This should help the sale of Indian and Ceylon teas in America.

PRICES OF PRODUCE.—The prices of produce, compared with those in the previous year, do not show general depression, and with the steady increase of consumption the outlook seems more favourable than was lately the case. In the tea, coffee, and sugar there are no special causes of complaint, and importers and brokers are inclined to take a hopeful view of the outlook.

CLEARING TEA.—The Commissioners of Customs have appointed a committee with instructions to report upon the mode in which the accounts are kept in connection with the various bonded warehouses particularly those in which tea is stored.

DAVIDSON'S SIROCCO.

Mr. Davidson has drawn our attention to a long letter in which he meets criticisms on his down-draught sirocco. We cannot find room for the letter entire, but we make extracts as follows:—

When your paper reached me in Belfast on the former occasion, I at once telegraphed to my agents, to, if possible, ascertain *where* the machine was to which "Darjeeling-ite" referred, and for them promptly to send my engineer, Mr. Maguire, to the place to put matters to right.

After some delay this was ascertained, and Mr. Maguire visited the garden. On examining the machine he found fitted upon the outlet of the fan, a pipe for conveying the exhaust air to the leaf withering loft, and not only was this pipe in itself much too small to let the necessary amount of air escape (unless the fan were driven at about double or treble the speed I arranged it for) but the air passage through it was further blocked by the pipe having several angles in it, and its end was entirely closed, but holes were made along it to let the air out in small jets, in accordance with Darjeelingite's special ideas for withering his leaf.

Of course Mr. Maguire insisted on this pipe being removed, as I did not arrange for the machine being worked as a compound leaf witherer and tea drier, and he very properly declined to make any test until it was taken off, eventually it was removed, and the trial of the machine's capabilities as a drier proceeded with. The details of the trial were most minutely entered up and tabulated in one of my usual report forms and signed by the Manager of the garden. This report shows 164 lb. of tea dried in the hour with 124 lb. wood fuel, and as it bears the Manager's signature, it would be casting a serious imputation upon him, were I in any way to doubt its being a "really fair trial" (as your other correspondent, "A Manager, &c." asks me to do) or to impute inaccuracy to what he signed.

My estimate was that the machine could dry about 100 lb of tea per hour with about 130 lb of ordinarily good wood fuel.

Now, sir, have I, or have I not, proved my case "up to the hilt" as against Darjeelingites original accusations that the machine could only dry half that amount of tea per hour, and would burn five times the amount of wood?

"Darjeeling" I see states, that although "The mechanical arrangements are otherwise good, one fault of the Sirocco is that dry air does not enter the machine but the damp air of the floor," but surely he scarcely expects the machine to manufacture its own air supply as well as work his pipe contrivance in addition to drying the tea!! He, however, says his pipe contrivance "cannot affect the action of the fan," and certainly if

the fan can cope with such a blockade as he applied on it without being affected thereby, why he may perhaps find it making its own supply of air some day as well!!

Meantime, however, I would advise him to provide the stove with *a direct* supply of air *from outside the house*, even although it be at the point of complete saturation (which is seldom if ever the case with the outside atmosphere) as air fully saturated at 65° F. if raised to 120° F. becomes practically dry air—which latter temperature is as low as air ever reaches in the exhaust of the fan. Hence saturated air at 65°, forms *practically* a dry air supply for an apparatus which discharges its exhaust air at 120° F. What causes many managers to think that it is owing to the dampness of the outside atmosphere on wet days that their driers give lower results than on dry days, is that on wet days the windows and doors of the tea-house are usually closed up, and they go on using the same air that is within the house over and over again with but little fresh air being admitted, and it is not long till this becomes absolutely saturated even at the high temperature it attains to, seeing that a Down-draft Sirocco passes about 300,000 cubic feet of air through it per hour and turns about 200 to 250lb. weight of water into vapour in the same time—so that ere long the machine is actually drawing in hot vapour with very little air in it and drying with superheated vapour instead of hot air to the very serious detriment of the quality of the tea produced. On fine dry days the windows and doors of the tea-house are all wide open, and the vapour gets out, and fresh air gets freely in and the drying goes on so much better in consequence.

My advice to all users of Siroccos is, to either blow the exhaust air out of the factory entirely or else provide a large duct to lead fresh air to the stoves from the outside atmosphere.

From the testimonials adhibited we quote as follows:—

From.—J. N. Campbell Esq., Superintendent of Morary Tea Estate Musketry [!—ED. *T. A.*] Ceylon, 22nd August 1890.

"Outturn per hour of dried tea 214 lb. wood fuel per hour 98 lb. This is equal to about 2½ lb. of tea dried per lb. of fuel."

From.—H. D. Dean, Esq. Superintendent Kintyre Tea Estate, Maskeliya, Ceylon, 6th August 1890.

"I am perfectly convinced that the capabilities of the Down-draft are in no way over-estimated in the advertisements, and have no hesitation in saying that from 180 to 200lb. tea an hour can be easily obtained from the machine."

MIXED SPICES.

A correspondent asks the nature of mixed spices, a question the reply to which will be of interest to many. Mixed spices are a compound of many different sorts, in order to save the housekeeper time, trouble and expense. She need no longer buy a small quantity of many sorts and experiment in combining them in the right proportion, for this is done for her by the spice dealer. In a popular formula the following eighteen kinds of spice are used: White pepper, shot pepper, allspice, ginger, mustard, coriander seed, celery seed, cloves, long pepper, cardamom seed, cassia buds, cumin seed, mace, caraway seed, Ceylon cinnamon, bay leaves, Chili pepper, Malabar pepper. The proportions are kept secret by the leading mixers, being regarded private property.—*American Grocer.*

CHINA: PROPOSED IMPROVEMENTS IN TEA GROWING.

Mr. E. Pinches, who lately gave the Shanghai Chamber of Commerce some information as to his proposals with reference to the cultivation of the tea plant in China, writes to the *N.-C. Daily News* as under from Tientsin, where he has been stopping on his way to Peking. Mr. Pinches says:—

'Briefly my proposals are simply to endeavour to obtain from the Government at Peking a tract of land either at Shanghai, Hankow, Foochow or Formosa, to be handed over to a Chinese Company for a period of not less than 15 years, in which would be established a tea-garden to be worked in the same manner as tea gardens are worked in India. The very latest tea machinery would be introduced, suitable buildings erected and the tea bush cultivated and plucked in the same manner as in India. The introduction of machinery would considerably lessen the cost of the tea and give China a better chance of competing with India. It would also improve the make and appearance of the tea. The reason to my mind why China tea has so fallen off in quality is simply that less attention is now given to the cultivation of the plant than used to be given formerly. The cultivator has received a lower price for his tea year by year. To meet this, instead of working up his cultivation more, so as to get an increased yield from his plant and thus reduce the cost of his tea and also improve its quality, he has spent less on cultivation, thus hoping to reduce the cost of his tea, entirely forgetting that by doing so he is really killing the goose that lays the golden eggs. The Chinese—at any rate in Formosa, the only tea district of which I can speak with confidence—have simply no idea whatever of pruning as understood in India. As a rule the tea bush is hacked down once in about six years, branches being left split halfway down in a most barbarous manner. Scientific pruning means really giving the tea bush a new lease of life. After a season's plucking, especially as done in China, there are a certain number of twigs which have a partially dead bark, and which if left alone will next plucking season only give very few leaves, and these of a thin sapless character. Cut away this partially dead wood at the end of the plucking season and next year when the sap commences to rise you will have a fine young shoot which will not only give you plenty of leaf but will also be good quality. I have always found the soil round a Chinese tea bush caked so hard that a fork could scarcely penetrate it. If this soil were properly loosened by forking round the bush more moisture would get to the surface roots of the bush, and thus ensure a more rapid rise of sap, which again would of course mean increased quantities of leaf. Again, the Chinese system of plucking is very bad. Chinese wait till in a plot of tea all the bushes have got a lot of leaf on them, and then men, women and children, sometimes the latter only five years of age, are let loose among the tea bushes. Nearly every leaf is ripped off the bush whether it is properly ready or not. Some of the leaves have of course grown too old and others are not properly ready. To get the best quality of leaf you must be constantly going round your tea garden, say once in 7 days or so, only taking the leaf which is perfectly ready and leaving the rest for your next time of going round. Practice alone of course can teach you this. If you allow leaf to grow too long it becomes hard and difficult to manufacture and does not make good tea. On the other hand if you pluck it too young you lose leaf, as if it had been allowed to grow a little longer, it would have weighed more. It seems to me a most extraordinary thing that such an intelligent race as the Chinese undoubtedly are should calmly sit down and allow one of their most important industries to pass away from them without making an effort to prevent it. If figures are true facts, unless the Chinese make some attempt to keep abreast of the times, at the present rate of yearly decrease in the China tea crop, about four or five years should see the end. There are plenty of tea gardens in India which can lay their whole crop down in London at an average cost of 7d per pound, some even less. China at present cannot do this. First let China try what can be done by a better system of cultivation and the introduction of the latest tea machinery, and then, if that is not enough to place her on an equal footing with India, the likin must be done away with.'—*China Mail.*

CEYLON TEA IN RUSSIA:

THE JAMES TAYLOR TESTIMONAL.

Kandy, Jan. 14th.

SIR,—I beg to transmit copy of letter from the Secretary to the Ceylon Association in London, together with the connected correspondence which is of public interest.—I am, &c.,

A. PHILIP,
Secretary to the Planters' Association of Ceylon.

LETTER FROM MR. LEAKE.

4, Mincing Lane, London, E.C., Dec. 24th 1890.

To A. Philip, Esq., Secretary, Planters' Association Kandy, Ceylon.

Dear Sir,—I have the pleasure to acknowledge receipt of your letter of 1st instant, informing me that the available balance of the vote of R5,000 towards Mr. Rogivue's mission to Russia is now R2,485·56. Of this I take due note.

I enclose a letter addressed to you by Mr. Rogivue together with a translation by him of an article from a Russian newspaper.

I am also sending you by this mail a copy of a letter addressed by our Association here to Lord Knutsford on the subject of the proposed increase of the amount to be contribution by Ceylon for military expenditure. In respect of this document the Association has been greatly indebted to Sir Arthur Gordon for the care and trouble he has taken in drawing it up.

Wishing the Planters' Association and its officers many happy and useful years,—I remain, yours faithfully,

WM. MARTIN LEAKE.

P. S.—Our list for the Taylor Testimonial amounts now to £106 7s. The following names have to be added to the list:—

The Colombo Commercial Company, Ld. ..	£5	5	0
C. E. G. Hatherell, Esq.	2	10	0
Messrs. Geo. White & Co.	2	2	0
R. A. Cameron, Esq.	1	1	0
Sir G. H. D. Elphinstone, Bart..	1	1	0
J. H. Alexander, Esq.	1	1	0

"THE TEA FUND."

Moscow, 1st/13th December, 1890.

To A. Philip, Esq., Secretary, Ceylon Planters' Association, Kandy.

Sir,—I wrote you last on the 30th August/11th September and have since sent you through Mr. Wm. Martin Leake, London, my general report upon my mission in Russia, dated London, 15th October 1890, which I trust, has reached you in order and has given satisfaction to your Committee.

In London where I was for about three weeks, I was indeed very fortunate in making arrangements with an old and kind friend, Mr. P. G. Spence, who gave me, with capital credit, good advices and introductions, a very helping hand for the establishment of a business here in order to push by the *direct* trade the Ceylon Tea in Russia. I returned here about a month ago and I am now ready to open on Monday next, 3rd/15th inst., my office and store of the "Ceylon Tea and Produce Agency of Russia," for the sale by retail, wholesale and, or, otherwise, the speciality of "Ceylon tea" exclusively, which, as I have already written you, has never before been brought *as pure* to the reach of tea consumers in this country.

I am expecting in a day or two from London a first supply of Ceylon tea selected by me especially in London to suit the Russian taste, which, I hope, will sell rapidly, and I trust to have before long to report of having been successful in establishing a good and regular trade for this staple of your island.

A fact worthy of notice—which, I think, will please your Committee as showing that Russian merchants begin to take great interest in Ceylon tea—is that Mr. Popoff, Managing-Director of the large firm of K. N. C. Popoff Bros. & Co., Limited, whom, when I visited him two months ago, would not listen to anything about Ceylon teas, will now very shortly proceed to Ceylon with a Dr. (Professor of Chemistry) to analyse and taste them there, study everything connected with their planting and manufacture. This, of course, is a very important question and shows a good advance in the work done by me in Russia, as I am certain it will very soon lead to large imports of Ceylon tea into Russia.

Regarding the Reuter's telegram published in the Ceylon papers some time ago, "that the Russian Minister of Commerce proposed to establish a direct trade with Colombo and to introduce Ceylon tea into Russia," I may mention that the other day, on my return to St. Petersburg, wishing to interview the Minister of Finance, His Excellency M. Pichnegratsky, upon this important question, I had the good fortune of an audience with him, and he told me that the question has indeed been brought before, and agitated by, the Government, but that, up to this time, the best means to be adopted to do it, has not yet been found. However, he thinks that my establishment in Russia to sell Ceylon tea will greatly facilitate the matter, and he offered me every kind of protection and assistance in my enterprise. It is certain that the Russian Government will do anything to introduce into the country and protect an article of "*first necessity*" to the Russian public, which they can procure so much nearer than China and of better and *purer* quality. They have been stimulated by numerous articles published in the Russian press upon the subject, of which I send you the translation of one, which will perhaps interest your Committee and the public in Ceylon.

My work of "reclame" for Ceylon tea is, however, far from being completed. I shall have still large expenses to incur for advertisements, publications, etc. and will require all the money available for me in London, voted for the purpose by your Committee; and I hope that the latter will continue to support me, and be, later on, in a position to grant me, *if necessary*, some further funds to be spent for the continuation of my work.—I remain, dear sir, yours faithfully,

M. ROGIVUE.

[Translation of an article published on the 16/28 October 1890, in the *Moskowsky Wedamosty*, No. 286.]

THE NEW CEYLON TEA MARKET FOR RUSSIA.

A telegram from St. Petersburg on the 1st October 1890 says the following:—"The Minister of Finance and Foreign Affairs had proposed the establishment of direct commercial communication with Ceylon, in order to introduce Ceylon teas in our markets. It is contemplated, with this proposal, to get independent of English tea markets and to prevent the adulteration of teas which is more and more complained about as taking place in China and London."

This appears to us as a *word of gold* on behalf of Russian interests. Up to the present time, we Russians, on account of our little enterprising spirit, have bought, and are buying, have drunk and are drinking Ceylon and Japan teas (where we have no Russian agents) as *China teas*, through the medium of *English merchants*.

Japan tea differs very little from China tea. The Japanese have already, long ago, taken the greatest care and trouble with the planting and preparation of their tea; let us say more. The Japanese prepare their tea in a much cleaner way than the Chinese, and this may be accounted for by the smaller quantity they produce and also by the "go-ahead" spirit of the Japanese who are, no doubt, more civilized than the Chinese. In Japan there is no primitive dirty hand-work to be seen in the preparation of tea such as we have seen and heard as being done in China. In India and Ceylon the tea manufacture is still on a higher scale, and, as East India is of so near neighbourhood with the Chinese tea hills, it is quite comprehensible that they have taken so much of the Chinese ideas for planting and cultivating tea, the position of the mountains and the climate there being greatly in favor of good cultivation; the result has been therefore, that very fine qualities of tea have made their appearance from the hills of Hindustan. But, let us go further, and we see the tea cultivation in the island of Ceylon, with her peaceful and hardworking Sinhalese and the most

propitious soil, has, in every respect, gained the best ground, and there a plant gives 12 to 15 pounds of tea whilst the same plants in China would give only about 10 pounds, and this only stimulates the energy of the Sinhalese and induces them to venture largely in the planting on their own account.

It is not long ago that Ceylon began to plant tea, and already such enormous and splendid results have been gained, that capitalists have taken seriously the matter in hand.

The teas which are planted and prepared in Ceylon can certainly, with very few exceptions, be advantageously compared with the tea produced in the *best* Provinces of China, viz., Kin-Tschow and Quen-Fan. The tea from the Provinces Fau-Bohea-Dan and Panan-(Asjam-Tan teas are not to be compared) are positively inferior to Ceylon and even Japan teas.

Ceylon tea, however, cannot compete for flavor and aroma with the high grades of China "Monings"; but certainly they are equal to the best Souchongs and Paklings to be seen and so much praised in China. All these kinds have their first and best grades, and find a large sale in Europe.

England makes an enormous amount of money with her tea business, especially with Russia, where almost all the best sorts—which are here rather scarce and difficult to be found—are imported. Such a second-hand purchasing method is of course very detrimental to us; it only gives help to the foreign country who act as third hands in our tea trade and deprive Russia of a lot of benefit. In view of our unsatisfied requirements in high-class teas, which cannot be bought on the direct markets without the intervention of a third party, the offer of our Ministers to come to our help for direct communication between Russia and the Ceylon market is to be considered as *most valuable* and *desirable*. At any rate, the teas bought in Ceylon and shipped *via* Odessa, have the great advantage of a much shorter voyage. By its geographical position the island of Ceylon is certainly by half nearer Odessa than Shanghai, and again also nearer than Chankow, the only market where Russians operate. Therefore the development of the tea purchases in Ceylon would not only be very desirable for Russia, but also a very easy possible "factum" to attain. The question is whether our oldest Russian firms, who lead the tea business in Russia, will be enterprising enough and have the energy to develop in the proper manner this, *without doubt*, profitable business.

As a proof of the advantages to be derived from this business, we may point out the rather—so to say—secret way the English houses are speculating upon the Ceylon Tea Market. They conduct this business in such a clean, "robber-like," better said, "smuggling" style and fashion, and selling Indian and Ceylon teas for "Fooochow" teas, which, for aroma, taste, flavour and appearance are much the same. Packing also is counterfeited; and with the aid of English agents, the Ceylon packages, cards, labels, etc., are transformed to give them the appearance of Chinese "emballage."

All these deceive the clients and lead them to great errors in accepting quietly Ceylon "Souchongs" for Chinese "Monings."

Would it therefore not be better that we Russians, instead of helping the unfair trade and without allowing ourselves to be cheated and robbed, find the best remedy for buying direct the genuine and desirable merchandize, and thus save the medium of European merchants to whom we pay so enormous profits for "dark" commissions and who are so fond of speculating upon our pockets!

(Sgd.) G. KUDINOW.

Kandy, 1st December 1890.

To the Secretary, the Ceylon Association in London 4, Mincing Lane, London.

Dear Sir,—I beg to acknowledge receipt of your letter of the 31st of October with enclosure, and also yours letter of the 7th ultimo, which shall be duly submitted to the Committee at next meeting.

Meantime, I beg to state that your demand draft for R728·27 has had due protection, the amount being passed to debit of the grant made towards Mr. Rogivue's mission to Russia for the purpose of introducing Ceylon tea.

The cost of the remittance of the £150 on the 15th September was R1,786·17 at exchange of 1/8 13 16ths per rupee plus cost of message R22, and I enclose a memo. showing the different sums advanced up to date leaving an available balance at date, of say R2,485·56.—I am, &c., A. PHILIP, Secretary to the Planters' Association of Ceylon.

CHINA TEA AND RUSSIA:

The *Morning Post* thus concludes an article on Tea:—Though China has been beaten back from the commanding position it formerly occupied in the British tea markets, it must not be inferred that the total tea trade of the Empire has suffered in anything like the same proportion. It has declined, but the decline since 1886 has been only a little over 12 per cent in quantity, and about 7 per cent in value. It would be altogether premature, therefore to assume, as some rashly have, that China is on the point of losing her foreign tea trade. Russia, so eminently conservative in its preference for certain grades of tea, is beginning to take kindly to the Indian leaf, but there are still many countries, such as the United States, where people evince a strong objection to any but the genuine growths of the Flowery Land. Still, when a comparatively small island like Ceylon can raise and export in a single year over forty million pounds of tea it is evident that the Chinese cultivators will have to bestir themselves pretty actively, if they are to hold their own in those markets they still contrive to monopolise.—*L. and C. Express.*

NOTES ON PRODUCE AND FINANCE.

TEA COMPANIES' SHARE LIST.—We are now able to show particulars of fifty of the limited joint stock tea companies with headquarters in England and with a sterling capital. The list (which, however, does not yet contain more than about three quarters of the entire number of companies which exist), shows an aggregate paid up capital of nearly £5,000,000, a debenture capital of £500,000, and reserves of about £200,000 (or about 5 per cent on the capital).

TEA INCREASING IN POPULARITY.—The consumption of tea should be largely on the increase. At a West-end club no less than eighty teas were served on a single Saturday afternoon, and the tea shops of the Aërated Bread and other companies are usually full. Mr. Gladstone is a confirmed tea-drinker, and, unlike other people in this as well as in other things, finds a strong cup before bed-time an excellent sedative.

MINING AND PLANTING.—A company with the title of the Indian Gold Mines Company, Limited, has just been registered in Scotland. The capital is £50 00C, divided into 5s shares. The object is to acquire, and work gold and silver mines, mineral and mining rights in India and elsewhere, and to grow coffee, tea, or cinchona. The first subscribers who take one share each are:—W. Anderson, Govan Factory, Glasgow; A. Breingan, Bank of Scotland, Helensburgh; P. Houston, C.E., 12, West Clyde Street, Helensburgh; W. A. Smith, merchant, 6, Hanover Street, Glasgow; W. H. Malcolm, writer, 119, St. Vincent Street, Glasgow; John Brown, Brandon Grove, Helensburgh; J. Mitchell, The Mains, Helensburgh.—*H. and C. Mail.*

ALOE FIBRE.—The last advices from Europe, shows a rise on prices, and has had for effect to revive the pretention of the manufacturers and would not be possible today to obtain good qualities under R250 to R260 per ton. Second qualities remain untouched.—*Mauritius Gazette*, Dec. 11th.

(Compiled by the Ceylon Chamber of Commerce.)

EXPORTS OF CEYLON PRODUCE from Colombo and Galle Annually during the past Ten Years.

COMPILED AS FROM 1st JANUARY TO 31st DECEMBER IN EACH YEAR.

		Coffee, cwt. Plantation.	Coffee, cwt. Native.	Coffee, cwt. Total.	Cinchona Branch & Trunk. lb.	Tea lb.	Cocoa. Cwt.	Cardamoms. lb.	Cinnamon. Bales lb.	Cinnamon. Chips lb.	Coconut Oil Cwt.	Copra Cwt.	Coconut Ponac. Cwt.	Coconuts.	Plumbago. Cwt.	Coir Cwt. Rope.	Coir Cwt. Yarn.	Coir Cwt. Fibre.	Ebony. Cwt.	Deer Horns Cwt.	Sapanwood. Cwt.	Orchella weed. Cwt.	Kitul Fibre. Cwt.	Citronella Oil. oz.	Cinnamon Oil. oz.
Total Exports from 1st Jan. to 31st Dec.	1890	82,005	4,004	86,009	8,728,886	46,901,554	15,981	387,940	1,894,514	441,447	362,690	129,502	145,088	11907.969	385,754	9,379	75,030	35,967	9.373	2,288	1,259	308	2,397	14,559,075	108,787
Do. do. do.	1889	83,300	4,782	88,082	9,283,729	34,048,085	19,054	361,224	2,010,096	562,543	356,576	33,384	136,237	6004,641	475,516	9,778	82,183	31,356	3,572	1,988	1,080	547	2,771	10,263,433	100,234
Do. do. do.	1888	134.491	8,172	139,663	12,697,146	24,381,296	13,159	287,7241	1,685,183	473,840	306,974	138,578	103,182	5197,704	225.731	8,701	82,016	23,299	12,177	2,434	2,750	484	1,793	10,559,465	141,298
Do. do. do.	1887	169,275	8,569	177,844	12,599,847	13,800,645	16,301	344,918	1,634,602	342,416	314,842	137,853	101,084	10712,407	239,078	9,640	70,148	22,750	15,366	2,203	7,625	1,394	941	8,828,578	38,042
Do. do. do.	1886	176,483	6,645	183,128	14,838,402	8,111,137	14,856	240,581	1,733,563	617,777	242,741	129,794	71,528	*	217,412	7,159	69,001	13,130	23,951	1,040	1,898	677	2,589	6,745,794	167,283
Do. do. do.	1885	306,833	21,281	328,114	14,097,142	4,411,578	7,247	180,705	1,552,500	634,575	266,376	144,625	42,517	...	199,782	9,893	79,772	16,552	19,325	1,728	3,547	437	2,278	6,570,132	90,830
Do. do. do.	1884	287,568	11,007	298,575	11,923,190	2,403,095	9,608	76,259	1,711,375	562,219	387,817	189,306	26156	...	189,912	11,715	87,912	12,951	14,381	1,224	1,311	966	1,212	4,997,333	104,24
Do. do. do.	1883	294,468	14,160	308,628	7,296,671	1,641,810	4,166	42,928	1,927,914	376,727	348,895	150,078	†	...	261.872	13,619	77,518	19,817	18,234	1,497	10,280	1,016	1,734	3,916,398	81,324
Do. do. do.	1882	422,773	40,531	463,304	4,402,901	660,760	1,090	21.580	1,587,016	422 915	207,958	68,875	...	...	258,877	9,579	66,803	7,959	13,931	2,375	10,157	896	1,496	2,940,046	93,022
Do. do. do.	1881	409,016	29,157	438,173	1,320,454	350,179	79	13,567	1,500.122	331,798	201,054	22,183	...	...	241,728	10,092	40,487	5,717	26,400	2,055	10,502	1,036	778	1.950,501	97,009

* No records previous to 1887. † No records previous to 1884.

DISTRIBUTION FOR 1889 AND 1890.

COUNTRIES.	Coffee: Cwt. Plantation	Coffee: Cwt. Native.	Coffee: Cwt. Total.	Cinchona. 1890 Branch and Trunk lb.	Cinchona. 1889 Branch and Trunk lb.	Tea. 1890 lb.	Tea. 1889 lb.	Cocoa. Cwt.	Cardamoms. lb.	Cinnamon. Bales. lb.	Cinnamon. Chips. lb.
To United Kingdom ...	56716	121	56837	8003452	7906762	43756912	32510747	12145	156264	1084837	237635
,, Marseilles ...	157	...	157	12500	...	1515	4866	80	..	105960	8800
,, Genoa ..	12	...	12	...	30412	3554	3121	...	...	133265	45024
,, Venice ...	118	232	350	70412	43411	2455	170	...	...	11100	11200
,, Trieste ...	7941	97	8038	546	..	4100	4542	...	7393	8900	20048
,, Odessa ...	32	...	32	...	..	275	...	...	...	...	..
,, Hamburg ...	296	..	296	730	...	43026	16925	913	1131	299082	91972
,, Antwerp ...	19	20	39	217919	48634	1600	270	..	...	22000	11312
,, Bremen ...	20	...	20	...	...	25578	14044	151	...	29948	...
,, Havre ...	...	100	100	...	...	4761	3685	8	...	10000	...
,, Rotterdam and Amsterdam ...	3	...	3	21384	91810	...	7140	55	...	...	11200
,, Africa ...	16	...	16	...	..	42382	14047	..	..	5000	...
,, Mauritius and Eastward ..	308	333	641	...	..	100666	16565	780	..	28500	...
,, India ...	2705	1752	4457	...	...	144631	289637	...	218156	12220	...
,, Australia ...	11738	1349	13087	...	..	2559901	1120094	9	40	9474	4256
,, America ..	1924	..	1924	401893	162700	204223	42252	1840	4956	89228	...
,, Barcelona ...	...	..	...	...	...	1150	...	...	..	45000	..
,, Stockholm ...	...	...	..	...	...	1703	...	...	..	...	..
,, Constantinople ...	...	...	..	...	...	3122	...	...	...	...	...
Total Exports from 1st January to 31st December 1890. ...	82005	4004	86009	8728836	9283729	46901554	34048085	15981	387940	1894514	441447

COUNTRIES.	Coconut Oil. 1890 Cwt.	Coconut Oil. 1889 Cwt.	Copra. Cwt.	Poonac. Cwt.	Coconuts.	Plumbago. 1890 Cwt.	Plumbago. 1889 Cwt.	Coir: Cwt. Rope.	Coir: Cwt. Yarn.	Coir: Cwt. Fibre.	Ebony. Cwt.	Deer Horns. Cwt.	Sapanwood. Cwt.	Orchella Weed. Cwt.	Kitul Fibre. Cwt.	Citronella Oil. Oz.	Cinnamon Oil. Oz.
To United Kingdom ...	98156	118504	25316	11	11229123	163860	228316	...	44941	28167	3081	2285	882	308	2334	10619479	91836
,, Marseilles ...	3000	...	15812	5	...	...	...	...	923	...	...	...	...	...	...	...	601
,, Genoa ..	4330	3482	11071	...	...	1134	8	...	3938	...	...	...	...	...	..	93500	...
,, Venice ...	200	401	...	...	...	...	102	...	...	...	...	...	...	...	...	...	...
,, Trieste ...	18333	10239	...	...	2000	...	204	...	538	...	..	...	242	..	...	...	642
,, Odessa ...	8062	5415	16028	...	...	...	...	...	...	...	...	...	...	...	...	...	...
,, Hamburg ...	19986	9071	20728	112863	93284	35232	10137	...	2378	463	..	...	...	...	...	..	1029
,, Antwerp ...	1565	1492	...	23898	...	16545	11263	...	...	40	...	...	...	...	...	...	...
,, Bremen ...	...	...	...	305	...	6895	1166	...	488	204	...	...	...	...	...	...	...
,, Havre ...	2607	4578	...	...	...	...	...	...	...	...	...	...	...	..	...	..	...
,, Rotterdam and Amsterdam ...	10	...	...	...	...	1616	437	50	2006	465	..	...	...	...	...	...	...
,, Africa ...	28	34	...	...	451470	...	...	25	...	...	...	..	...	...	...	...	...
,, Mauritius and Eastward ..	44837	7270	...	43	...	...	...	9156	2697	720	6292	...	...	...	...	...	...
,, India ...	98921	93074	38586	7963	130592	640	236	56	7732	377	...	..	135	...	58	40752	...
,, Australia ...	1821	1944	910	...	1500	406	304	92	1863	5232	...	...	...	...	5	..	...
,, America ..	61434	101072	1051	...	..	159426	223343	...	7026	299	...	3	...	...	...	3805344	14688
,, Barcelona ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
,, Stockholm ...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	..	...
,, Constantinople ...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...
Total Exports from 1st January to 31st December 1890. ...	362690	356576	129502	145088	11907969	385754	475516	9379	75030	35967	9373	2288	1259	308	2397	14559075	108787

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THE EXTIRPATION OF DELETERIOUS VEGETABLE GROWTH.

We had a call today (Jany. 20th) from Mr. R. I. Murchison, an Australian colonist, on his way back from India, where he has successfully interested the authorities in a specific he has invented for the destruction of deleterious vegetable growth. It is to be used freely for the extirpation of prickly pear and other troublesome growth in some parts of India. The specific is described by those who have witnessed its effects as quite wonderful for its speedy destruction of deleterious growths (vegetable) of any and every description from the biggest tree to the smallest grass. It has to be very carefully used, however, being a deadly poison, and also that it does not come near plants or trees that are meant to be preserved. The specific is supplied by the maker in the form of a powder, but applied in a liquor form. Mr. Murchison, who goes on by the S. S. "Valetta," expects to send an agent to visit Ceylon shortly, when fuller particulars will be made available and experiments no doubt undertaken.

CEYLON STAPLE EXPORTS AND THEIR DISTRIBUTION.

We call attention to the full and correct tabular statement given as a *Supplement* (page 592 *b*) today for our Staple Exports and their Distribution for a series of years. It is interesting to note in regard to *tea*, the increased proportion of our shipments diverted from the United Kingdom in 1890, thus,—

	1889. lb.	1890. lb.
Tea to United Kingdom ...	32,510,747	43,756,912
Do. other ports ...	1,537,338	3,144,642
Total ...	34,048,085	46,901,554

In 1889, the percentage diverted was 4 per cent; in 1890 it was close on 7 per cent of the total exports.

Summing up the exports to the different ports representing the European Continent, we find as follows:—

	1889 lb.	1890 lb.	Increase lb.
Tea for Continent of Europe direct	54,743	92,839	38,096
For Africa and Mauritius....	30,612	143,048	112 436
For America ...	42,252	204,223	161 971
For Australia	1,120,094	2,559,901	1,439 807
For India	289,637	144,631	145,006 (decrse.)

It is gratifying to see the largely increased export in the case of shipments to Australasia and Amrerica respectively, and we hope to see still greater progress made in 1891, while Russia should also take a big portion of our staple. The New Year has begun with heavy shipments and also with specially large sales of tea in Colombo, so that with sales rising to half-a-million lb. of tea per week, we can now offer ample encouragement to Russian or other large buyers to establish themselves in Colombo.

In regard to the distribution of our staples, the more notable facts are as follows :—the large share of our coffee taken by Australia which also figures for some cinnamon, coconut oil, coir and plumbago. America is a big customer for plumbago taking nearly as much as the United Kingdom and three times as much citronella oil, also a large quantity of coconut oil, some cinnamon, cocoa, coffee and cinchona bark. The Continent of Europe also takes large supplies of a variety of our products direct.

THE AMSTERDAM CINCHONA MARKET.

THE RICHEST AND AVERAGE BARKS.

The total quantity of cinchona bark offered by auction in Amsterdam in 1890 was 3,271,054 kilos., an increase of 58 per cent upon the quantity offered in 1889 (2,073,921 kilos.), and fully 2·25 per cent upon 1888 (1,435,647 kilos.) The following shows the composition of the Java barks, which form practically the whole of the Amsterdam supply:—

	1888. Kilos.	1889. Kilos.	1890. Kilos.
From Government Plantation	353,423	369,703	350,576
From Private Plantation ..	1,082,224	1,690,898	2,920,478

The average proportion in sulphate of quinine of the manufacturing barks was in 1888, 4·20 per cent; in 1889, 4·12 per cent; and in 1890, 4 per cent. The richest parcel of the year was offered for sale on June 5th. It consisted of 13 bales Ledger stem bark, in broken quill, from the Government plantations, and analysed 9 42 per cent of quinine sulphate. The Dutch broker who sends us these particulars estimates the total quantity sold by auction in London during the year at about 5,000,000 kilos., averaging 2½ per cent quinine sulphate, and being equal, therefore, to about 3,938,000 oz. The total of bark sold in Amsterdam equalled (according to the published analyses) 121,420 kilos. (about 4,250,000 oz.) sulphate of quinine. If these estimates are correct, the combined auction sale of bark in London and Amsterdam during 1890 have represented 8,188,000 oz. quinine sulphate.—*Chemist and Druggist.*

CINCHONA FROM JAVA.

The exports of cinchona bark from Java during the period from July 1st to October 31st are by far the largest of any corresponding section of the last five years. This is all the more noteworthy as the increase is entirely due to the enhanced production of the private plantations. The Government plantations, in fact have this year only exported about one-fourth of their average July-October shipments. The following are the figures:—

July 1st to Oct. 31st.	1890	1889	1888	1887	1886
Govt. plantns. Amst. lb.	64,208	231,410	226,235	238,246	168,550
Private plants. Amst. lb.	2,035,890	1,600,888	1,204,732	1,308,133	595,990
Total ...	2,100.098	1,832,298	1,430 967	1,546,379	764,540

—*Chemist and Druggist.*

PLANTING NOTES IN 1891.

(*Concluded from page 570*).

SOILS—FORESTS IN COORG AND IN CEYLON—SOIL POISON —INSECT PESTS AND INSECTICIDES—MANURES—THE GREAT OBJECT OF TEA CULTIVATION.

SOILS.—I will first begin by quoting from an article entitled "Forest Soils in "Coorg" from the *Indian Forester* of Dec. 1882, signed "Coorg (*Tropical Agriculturist*, Vol. II. page 734). The following facts regarding the forest soils in Coorg will be of interest; they somewhat upset the generally received theories as to formation of vegetable soil in forests:—

"Coorg, as will be seen by the map, is a little country occupying a small portion of the Western Ghauts, and jutting out a short distance in the Mysore plateau. The western slopes of the Ghauts are covered with dense lofty evegreen forests into which jungle fires never penetrate. On the east is a belt of deciduous forest, varying from four to six miles in width, which have been constantly burnt through by jungle fires for time out of mind; and indeed we may infer that this has been going on for centuries. Do not we all know that the natives of India always burn the forests on principle in order to get an

early crop of young grass for their cattle; in fact they consider it a duty they owe to themselves and their neighbours to burn off the forests as completely as possible. Is it likely that this is a habit developed of late years, and not rather one as old as the first settlement of inhabitants in the country? Then that the forest has been much in the same state for the last 500 years is proved by the existence of teak trees of that age which evidently grew in the same conditions from the first as they are doing now. The almost invariable wide centre rings two to three in the first inch seen in these ancient trees, would appear to give direct evidence of the young plant having been constantly burnt down every year, every time sending up a larger shoot until a shoot is produced, large enough and high enough to defy the jungle fire. This is the process to be seen going on under our own eyes. A teak plant grown under other conditions in the forest, would have six or eight rings in the first inch. We may then, I think, infer that these deciduous forests were constantly run over by fire 500 years ago, and have been ever since, and probably were burnt for centuries before that.

"Now what is the result on the soil? In the one case we have the virgin ever-green forest of the Ghauts in which fire never penetrates, constantly giving back to the soil a vast amount of vegetable matter in the shape of leaves, wood, and bark. On the other hand high deciduous forest, the vegetable matter from which has been constantly burnt by jungle fires for centuries. According to preconceived notions there would be a thick layer of the vegetable mould in the former and next to none in the latter. As a matter of fact the very opposite is the case. In the Ghaut forests there is seldom more than an average of 6 inches of vegetable mould—whereas in the deciduous forests there is a thickness of from one foot to 28 inches. It must be distinctly understood here that I am not speaking of scrub jungle but of high and fairly deciduous forest.

"In open scrub jungle the formation of vegetable mould is naturally very much less, and, as might be expected, if the subsoil is examined, it will generally be found to be poor. No doubt there are other circumstances conducing to the poverty of the jungle, and amongst these chiefly the want of rain, and these causes act and re-act on each other.

"The difference in the soil of ever-green forest and deciduous forest is very distinctly marked on the lower western slopes of the Ghauts. Here up to an altitude of 800 to 1,000 feet, the slopes are covered with semi-deciduous forest of *Terminalias* and *Lagerstrœmias* mixed with the large thorny bamboo, the greater portions of which are burnt almost annually. In coming down the Ghaut roads the difference in the soil of the road cutting is at once noticed; between the thin greyish layer of the vegetable mould of the ever-green, and the thick black layer of the fire-devasted deciduous forest, I have noticed the same thing on the Carcoor Ghaut from Nilgiris to Calicut. A few days ago in going through a coffee estate on the Ghauts, I passed a place where the soil was a rich deep black resembling what is seen in the Eastern deciduous forests, strongly contrasting with the absence of mould in surrounding portions of the estate. It had been lately dug, and on looking closely, I noticed a number of pieces of charcoal mixed with the soil. On remarking on this I was told the place was the site of a toddy-drawer' house and garden and the rich black mould was evidently partly produced from burnt vegetable matter.

"The fine coffee estate in what is called the 'Bamboo' district in Coorg owe their flourishing condition to the rich black vegetable soil of the deciduous forest: In the first days of coffee planting, every one thought that the soil of the dense Ghaut forests must be everlasting as compared with the deciduous, but the fallacy of this supposition is proved by thousands of acres of abandoned coffee estates on the Ghauts, whereas estates planted fifteen years ago in the "bamboo" are as flourishing as ever and shew no signs of decay. Supplies come up as well as when first the estate was planted, showing that the soil retains its vigour. In the Ghauts it is not so, the exhausted soil refuses to rear the young plant, so that vacancies cannot be filled up. And it is remarkable that this is not only the case on steep slopes, but also on flat places and hollows where there can be but little wash. I trust those observations will bring out those of other observers on the subject."

You put a footnote:—"On the other hand was it not the case that a large proportion of the bamboo estates in Wynaad were killed by borer?" Borer came because men attempted to grow coffee in a dry climate without shade; and in a specially dry year terrible were the ravages of that worm. But that was no fault of the bamboo. You will find it a good rule in selecting land whether high or low—*follow the bamboo.* This applies in Kalutara and Udugama.

As to the article above quoted the facts are borne out in other parts of India, and are they not borne out in Ceylon? Where are the evergreen forests? Ramboda, Nuwara Eliya, Dimbula, Dikoya, Maskeliya, Nitre Cave, Laggala,—in fact all those forests beyond the reach of chenaing, unswept by forest fires, and deluged with heavy rains. Then you have the deciduous forests of Uva, Dumbara, Matale, and Kurunegala, and between those extremes is the border land of evergreen forest land converted into scrub by constant chenaing in the past. We have thus 1st ever green virgin ghaut forest (example Laggala), 2nd evergreen forest converted into mana grass or scrub by chenaing (numberless example.) 3rd—deciduous forest; 4th—cultivated lands (not paddy). But now in applying this to Ceylon we must take the climate of our ocean island into account and we find the surface of most lands stimulated by the heat and moisture so that natural osmotic action is promoted without the help of a forest covering. Much land in Ceylon with its light scrub covering would be dried up and gradually rendered infertile in a dry climate.

Then we have other varieties of soils. There is Matale East where the whole soil is of a rich nature even in steep mountain slopes. Here coffee flourished and tea is now flourishing. Then you have the Ambagamuwa valleys where coffee was a great failure on account of the cold clayey nature of the soil. Then in the lowcountry the three tea districts—Kelani, Kalutara and Udugama—have to be considered. Kelani Valley is a long straggling district composed of steep valleys running up from the river where the soil is not rich, but, along with the steamy forcing heat, forms a good ground for the necessary evergreen growth of tea.

Kalutara also lies along a large river, and though the soil is of a poor description yet it has a firm subsoil which tea likes. Some of the flats in Kalutara are very fine.

Udugama is a district by itself literally and figuratively.

When you leave Galle you come on fine deciduous forests at Kottowe which are the remnants of old original lands preserved by the Dutch, and in a way also preserved by the British. This land proves that the remarks of the Coorg writer quoted above do not apply to *low*country forests, because when once the original forest is felled, the fierce heat of the Ceylon lowcountry extracts the nitrogen and available manurial elements of land where the soil is not rich, and gradually the land is covered with a poor scrub or that poisonous *kekilla* fern. As you approach Udugama you find all the original forest has many years ago been destroyed except in small pieces here and there. Large expanses are covered with the kekilla fern and show where a large cultivation was carried on 80 or 100 years ago by natives who were driven away in the first place by fever and elephants and in later days by the law prohibiting chenaing. The soil in Udugama is poor by reason of the tremendous amount of sand with which it is clogged. The roads and drains are full of white sand. It is also full of what would be considered the very thing for tea—namely *iron.* The streams run red with the iron ore. But read *Tropical Agriculturist,* vol. II., page 508:—"Soil Poison.—Nearly all soils contain iron; it is this that gives them their reddish colour. But iron has two oxides. One of them, containing the least amount of oxygen, is soluble in soil water,

and is therefore readily taken into the roots of plants Copperas, or green vitriol, is composed of this low. or protoxide of iron and sulphuric acid. On exposure to air for a time, this low oxide takes in more oxygen, forming what is called sesqui-oxide of iron which is insoluble in water. The subsoil which has never been stined to admit the atmosphere freely, contains the low oxide, and when first turned up, if sown or planted soon, the roots of the crops take in this poisonous soluble compound of iron and are much injured if not killed outright.—*American Agriculturist*

Now may I apply all this to tea cultivation? As far as I have seen the best soils for tea are those that have a stiff subsoil into which the tea-tap-root descends, like the Ghaut evergreen forest tree, and yields a large return of leaf or flush. If there are good manurial qualities in this soil all the better. Then the next best soil is that of Matale or Haputale of high manurial quality and of good consistency combined with favourable climate.

Then the next is that of Kelani Valley and Kalutara, where the subsoil has good consistency, and though the manurial qualities are deficient, yet the climate is steamy and forcing.

After this comes the general run of old coffee lands in the Central Province, where there are pockets and valleys which possess favourable conditions for tea. But in all this will it be said that manure is not wanted? Government must help the planting enterprize and allow manure to be carried at very low rates. You will see in a few years, that a universal revival of manuring (fish or poonac) will arise in the Ceylon tea districts. Let me quote *Tropical Agriculturist*, Vol. II. page 418:—

"It is assumed, but not proven, that electricity nitrifies the azote of the air in the interior of the soil by a union with hydrocarbonaceous matters: or effect a similar end in the interior of plants by their starch sugar, &c. We know however that the azoteous matters in the soil can be nitrified, but that is not an augmentation of richness. * * *

"The extent of vineyards in France is 4½ million acres. One quarter of this area is invaded by the phylloxera, and the new ravages of the insect are estimated at the rate of 200,000 acres annually. Three official remedies are recognised. Sulp. carbonate of potassium and sulphuret of carbon, submersion, and American stocks for grafting on the affected vines. To these must be added a relatively high manuring. It has been found that purely nitrogenous manures, as wool-clippings, ham-parings, dried blood, oil cakes, &c., develop the vine at the expense of the fruit; but farm yard manure, or a composition of potash salts, soluble phosphates, and a proportionate dose of azoteous matters have the opposite effect."

Here now—"*developes the vine at the expense of the fruit.*" That is what tea planters have to attend to. They have to develop the tea bush at the expense of the seed by applying purely nitrogenous manures such as fish, oil-cakes, &c.; while cacao planters must use farmyard manure to develop the valuable fruit on which their efforts depend. The *Tropical Agriculturist* is a treasury of richness to the planter who is beyond the reach of libraries. It is a library in itself from whose shelves one may gather much knowledge if he only looks for it.

There were Mr. Carter's experiments which are well worth studying. In reference to those Mr. Hughes says (*T. A.*, Vol. V., page 465):—"In my remarks upon Mr. Carter's experiments I pointed out the probable reason why the results of the application of castor-poonac had proved more satisfactory than those obtained from the use of bone-dust, namely, that, inasmuch as nitrogen was the principle manure ingredient required by the tea plant, it was only reasonable to conclude that the fertilizer which supplied the largest proportion of this valuable constituent in a form suitable for assimilation was the most suitable and economical manure for tea plantations." See the rest of his remarks. He concludes as follows:—"That tea plantations will require manure sooner or later, there can be no doubt whatever, and the poorer the soil and the more forcing the climate (lowcountry planters please attend), the more immediate necessity will there be for its application, hence the importance that planters should select these manures which are likely to prove practically the most economical."

Mr. Carter recommended manuring at the rate of 24 cwt. of poonac per acre every three or four years. The great object in tea cultivation is to do everything in our power to keep the soil moist and prevent drying up or pulverization of the soil which will check the necessary evergreenness of the tea bush. * Thus forking and digging are inadvisable in ordinary soils, still more in light sandy soils. But in very adhesive soils digging is necessary to enable the soil to *retain* moisture. You all know how sticky clayey or loamy soils are in wet weather and how hard and metallic they are in dry weather, these soils should be dug, forked, turned over and kept broken. Why? Because you introduce large quantities of air between the lumps, and this prevents the process of evaporation by the sun in dry weather, from drawing every drop from the soil. On the other hand it prevents saturation and stagnation of the surface in wet weather, which tends to rot the fibres of the plant. Thus it is only an adhesive soil that should be forked or dug. Of course with a soil like Udugama where there is a poisonous protoxide of iron present the turning up the soil and admitting air will do good. Mr. Cochran (*Tropical Agriculturist*, Vol. VII, page 569) says: "Protoxide of iron is converted into the harmless or beneficial peroxide by aerating the soil by mechanical working or by liming." *Liming!* surely this is the only case where lime is wanted. Lime is the bane of a tea planter. It promotes long inter-nodes of wood and rapid run to flower and seed, because it renders food more quickly available to the plant, and this is useful for fruit-growers. Why is it that on an old coffee estate which has been converted into a tea estate, those fields where crops were heaviest in coffee will not grow tea satisfactorily? Some might say that was because coffee had exhausted those fields. No, the reason is that generally the soils where coffee did not flourish are the soils where tea yields leaf most freely. Of course, this rule does not apply all round, as there are places (Dambullagalla and Nayabedde) which were mines of wealth in coffee and are mines of wealth in tea. That is because, taking for granted the soils are rich, yet they contain constituents and meet conditions which are favourable to tea growth, namely—they have nitrogenous elements freely available and the subsoil is sufficiently adhesive. Thus you have the necessary vigour which would go to fruit or seed if allowed, but, being checked, allows a full crop of leaf to be taken. But a soil like this must be supplied with lots of nitrogenous manure to make up for this heavy exhaustion of certain elements.

Thus flat land, adhesive yet manurial subsoil (well forked), forcing damp and hot climate is the best for tea.

Flatness saves disturbance of the main roots of tea which are sensitive of injury.† Adhesiveness of the soil (if forked) with good manurial properties promotes evergreenness and luxuriant foliage.

Damp heat is known everywhere to be a forcing agent in promoting vegetation. I have, perhaps, wearied you by these imperfect notes. But if I have even in a small way, helped to arouse the Ceylon planters to the necessity of manuring, my object will have been attained.

"1873."

THE WYNAAD PLANTERS' ASSOCIATION has suggested to kindred bodies that a prize of at least £20,000 should be offered for a practical cure for Hemileia, the cause of coffee leaf disease. The French Government has a standing offer of 300,000 francs for a practical cure of phylloxera.

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* In coffee we had to check the evergreenness of the bush to force out fruit buds

† To prove how sensitive the side roots of tea are it is a fact that young tea plants will not tolerate "trimming" the roots when taken from a nursery; whereas this treatment benefited young coffee plants. In forking adhesive land care must be taken not to go near the plants.

COLD WATER WITHOUT ICE.

The following method of obtaining a constant supply of cool water at all times is described by *The Railroad and Engineering Journal* as being in general use in Hanover, York County, Pa. The town, says the *Journal*, is closely built up and without any system of drainage, so that the water from the wells is unfit to drink. Some years ago these reasons led to the introduction into the town of a supply of very excellent water from a large spring about three miles distant. This water is brought through iron pipes, and when it reaches the consumer in summer is warm, while the water in the wells is cool. For this reason many of the inhabitants drink the well water, and as a consequence, typhoid fever is a prevalent disease in that community. In order to obtain pure cool water, not impregnated with lime, some of the inhabitants of the place have adopted a plan which is so simple and gives such excellent results that it is worthy of general adoption wherever there is a water supply other than wells or springs.

The plan is as follows:—A cylindrical galvanised sheet iron tank, 12in. in diameter and 4 or 5ft. long, is placed in the bottom of a well. This tank is then connected by a galvanised iron pipe with the water supply pipes, and another pipe is carried from the tank to the surface of the ground, or to any convenient point for drawing water, and has a cock at the upper end. The tank is consequently always filled with water from the water supply, and being in the bottom of the well, the water is cooled off and acquires the temperature of the well; so that that which is drawn from the tank is as cool as well water, and is without any of the impurities with which the latter is contaminated. The water drawn from the tank in one of the wells in the place named had a temperature of 56deg. when the thermometer in the atmosphere above stood at 76deg.

This method gives an abundant supply of cool water during the whole summer, and can be adopted in all cities, towns or in the country. If a well is available it can be used; if not, by simply digging a hole in the ground, deep enough so as not to be affected by the surface temperature, and burying the tank, it will answer equally well. This hole might be dug in a cellar or outside the building. If the water has any impurities in suspension, such as mud the tank should be made accessible so that it can be cleaned separately.—*Invention.*

JAMAICA SORREL.

There is one plant that would well repay a more general cultivation than it now receives—at least from a housewife's point of view. That is the Jamaica Sorrel plant. It grows readily from seed, stands transplanting well, bears prolifically, and the fruit when cooked in jelly, or as sauce, so closely resembles cranberries as to almost deceive an expert. It is quite as good and wou'd prove a most excellent substitute for those delicious berries. The plants in this neighbourhood are now just blooming and in two or three weeks will be ready for culinary purposes, and unless injured by cold, will continue bearing till sometime after Christmas. The plant should be cultivated by every family where a delicious jelly, or sauce, is suddenly appreciated.—*Tampa Journal.*

[Ordinary sorrel comes on exhausted ground in Australia and after a time is said to restore fertility. But what is this Jamaica sorrel?—ED. *T. A.*]

OLD King Coffee is once more making an effort to raise his head. A Hapu'ale proprietor tells me that this season he will obtain a better crop than he has had during the past 12 years, and in consequence, he and other planters have ceased planting up more tea. I also hear of an estate in the Rangalla district with good coffee prospects, so good indeed that an abandoned block is to be re-opened with the old staple! I hope anticipations will be realized.—*Cor.*

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Jan. 1st.

ESSENTIAL OILS.—In Citronella there has been some business today at ⅞d per oz. for bottles; tin oil is quoted at ¾d to 13-16ths per oz.

COCONUT OIL.—Steady of sale, with some business in fine Ceylon, delivered at 29s; and for near at hand 26s 9d to 27s is quoted. Cochin oil on the spot is held for 33s 6d to 34s; and for near at hand 32s. c.i f. terms.

QUININE.—Since our last report this article has been in good request, and prices improved slowy until today, when the market again became noticeably weaker. The transactions reported since the middle of last week include about 100,000 to 120,000 oz. German-bulk quinine (B & S and Brunswick) in second-hands, at from 12d up to 12¾d per oz, the latter price being paid yesterday but today it would probably be possible to buy at 12¼d per oz. This morning it was announced that Messrs. Howards & Sons had reduced their quotation by 1d per oz, their brand in bulk being reduced to 1s 5d, and in vials to ·s 7d per oz. The announcement of this reduction appears to have created some surprise. For delivery, the transactions which have become public total up to about 5·,0·0 or 60,000 oz second and first hand German bulk (B & S and Brunswick), at 12¼d up to 12¾d per oz for near-at-hand to March delivery, and the B & S agents report also a sale (for consumption) of 5,000 oz at 13d per oz, early delivery.

HOW TO CAPTURE PORCUPINE.

Has Mr. Nock, who is so much troubled with porcupine in Hakgala Gardens, ever tried the native dodge (a trench baited) as related by "Tennent"? Here is the passage from his "Ceylon":—

Porcupine.—The Porcupine* is another of the *rodentia* which has drawn down upon itself the hostility of the planters, from its destruction of the young coco nut palms, to which it is a pernicious and persevering, but withal so crafty, a visitor, that it is with difficulty any trap can be so disguised, or any bait made so alluring, as to lead to its capture. The usual expedient is to place some of its favourite food at the extremity of a trench, so narrow as to prevent the porcupine turning, whilst the direction of his quills effectually bars his retreat. On a newly planted coco-nut tope, at Hangwelle, within a few miles of Colombo, I have heard of as many as twenty-seven being thus captured in a single night; but such success is rare. The more ordinary expedient is to smoke them out by burning straw at the apertures of their burrows. The flesh is esteemed a delicacy in Ceylon, and in consistency, colour, and flavour, it very much resembles that of a young pig.

THE FORESTS of "Darkest Africa" strike the imagination; but they are not the greatest on the earth. In the Empire of Russia there are 491,248,000 acres of forest; in Africa, according to Stanley's calculation, there are only 224,000,000 acres.—*Home paper.*

COL. BELL'S MEMO. ON MADRAS IRRIGATION.—Some copies of a memorandum by Col. J. H. Bell, R. E., late of the Madras Public Works Department, on the Irrigation Works of General Sir Arthur T. Cotton, K. C. S. I., R. E., in the Madras Presidency, have been sent out by the former officer now in England for distribution to officers and others in Madras Public Works Department. Colonel Bell in forwarding the copies has informed the Chief Engineer that the memorandum was drawn by him at the special request of Indian Engineer officers. Colonel Bell, we believe, is the only officer who was personally cognisant of the details of all Sir Arthur Cotton's projects, and it is highly desirable that his memorandum should be put into the hands of all Engineering officers. The volumes have been supplied gratis, and have been acknowledged with suitable thanks by Government.—*Indian Engineer.* [Copies ought to be obtained for the Ceylon Irrigation Officers.—ED. *T. A.*]

* Hystrix leucurus, *Sykes.*

SAMBAS IN WESTERN BORNEO.

(Translated from the "Indische Mercuur" for the "Tropical Agriculturist," by Mr. John Dent-Young.)

SEARCHING FOR GOLD—SAMBAS AND ITS DESCRIPTION—CONNEXION OF NETHERLANDS WITH SAMBAS—THE SULTAN—AGRICULTURAL UNDERTAKINGS.

There was a time when the very name of California caused excitement. Huzza! for California! the cry gold! gold! resounded on every side. Later on Australia was the centre to which all eyes were turned. There again was gold, the attraction which drew vast crowds to that part of the globe. And now whenever we take up a journal, we find gold to be the great exciting cause of the multitude.

Numerous are the associations which are now working gold mines with more or less success in South Africa, and multitudes are presenting requests to the Resident of West Borneo for permission to set on foot scientific examinations of sites for gold mines. No less than thirty-three such applications have been tendered in Sambas alone, whilst in other parts of the Residency 60 concessions have been applied for. Public attention had hardly been turned on Sambas before requests poured in for such concessions. Thanks to the ready co-operation of the Resident and the Sultan, but little formality is necessary in making those requests. Frequently the simple mediation of a friend has been sufficient. As a preliminary, the application is made for permission to institute a scientific search for gold, for the Government insists on this, and it is only after the lapse of three years that the permission is exchanged for a notarial contract. In this way the danger of sinking capital in a bottomless pit is greatly diminished if not altogether avoided. During these three years there is surely time to make such an inspection of the ground as can establish proof of its being able to repay the cost of working or not; if unfavourable, no further loss is incurred, than the outlay for making the inspection, a risk inseparably connected with all such undertakings.

But we are speaking of the district of Sambas as if it was a well-known locality to each and all, whilst some of our readers may be desirous of knowing more about the possession, for which reason we propose to give the following brief sketch of it:—Sambas is under a Sultan dependent on Netherland, situated at the northern extremity of West Borneo; it is bounded on the north by Sarawak, on the east and south by Landak, on the south by Mampawa, and on the west by the sea, or to be more precise it stretches from Tandjong Datu in the north-west to the Duri river which forms the southern boundary, to the north and north-east it is bounded by the mountain chains of Krinabang-Semadju and Kewai, whilst on the south and south-east it is separated from Sanggow and Landak by the Kurum, Bajang, Mint and Pandang mountain ranges. Sambas comprehends the basin of the river of the same name, from its mouth to its confluence with the Sambas Kiri and Kanan.* The Sambas river takes its rise in the above-named southern chain of mountains, and falls into the sea at Pemangkat after traversing the Chinese settlement of Larak, becoming navigable at Ledo. To the north of the Sambas river rises the mountain of Palo, well-known for the iron of superior quality that it used to furnish.

Sambas, the chief town of the State, lies at the confluence of the abovenamed two branches. It presents to the visitor but little beauty for his admiration. It contains however a good place of entertainment, so that anyone wishing to make some stay there will find no difficulty in obtaining a lodging. Sambas is at the same time of easy access. Every month a steamship belonging to the Ned. Ind. Steam Navigation Company leaves Tjandjong (Chanjong) Priok for Pontianak *via* Biliton. Soon after the arrival of this ship, a steamer belonging to the transport contractor leaves the port according to the terms of the contract for Sintang, whilst one of the ships belonging to the Indian Marine leaves for Sambas *via* Singkawang. The vessel of the transport contractor leaves Pontianak on the last day of every month for Singapore *via* Singkawang and returns by the same course.

Should the traveller not wish to go direct from Batavia, he should take his passage on board one of the fine steamships built expressly for this service, the "Ban What Soon" or the "Ban What Hien," the former of these two has plied for years between Biliton and Pontianak, and the latter has for some months taken her course *via* Sambas. The development of the mining and cultivating operations on the concessions will decide if steam communication can be continued. As the two lastnamed vessels are bound by no contract, they do not adhere to any particular time, and therefore the transit *via* Batavia is to be preferred, as well as on account of the necessary formalities which have to be fulfilled. Let us then select this route, go over to Pontianak, and thence make our way to the Sambas river. As we enter its mouth, we see what appears to be a vast lake, as the river for some distance inland is of great breadth. Both sides are bordered by thickly-wooded hills, amongst which the lofty Peribangan rears its head, overtopped in height by the more distant Bukit Pemongkat, whose dark summit and light-green sides are recognized at a great distance. On the right bank towers on high the Kalimbu, a so-called saddle mountain. To the left of us is the Chinese settlement, while in our front, to the north-east the Bukit Raja extends its crown towards the heavens, whilst its foot stretches away like a tongue of land ending in the rocky Kalimbu. But let us make way for the words of the admirable writer on Borneo's West Coast:—"Further eastward a noble panorama opens to the view, endless forests fringed on the seaside with tjemaras (chimara trees) and extending beyond the Kumé and Batong Mountains, which appear like grey masses defined in sharp outline against a cloudless sky, with the Sambas river shining through occasional openings like a silver band. Here bright green rice-fields and gardens, next clumps of coconut palms and other fruit trees, lie like islands spread about in this of sea green. In the midst rises the Bukit Pemangkat. Its summit is clothed with heavy timber, its slopes are planted with cnau palms, or are terraced for rice cultivation. From all parts flow rivulets; here, rushing wildly over bare crags whence they are led to water the neighbouring rice-fields; there, winding gently amongst magnificent orchids, and picturesquely intwined, climbing plants which serve to protect man and beast; westward lies the boundless sea before us, always in motion, always full of life. And through the green waters shine huge stones and rocks with which the coast is strewed."

A sandbank in the embouchure of the river, alas! prevents the entrance of ships of greater draught than 12 feet; higher up the Sambas presents no features of importance except to the lover of the picturesque. "Besides the Chinese Settlement at the base of the Pemankat," thus continues the Heer Veth, "nothing beyond the town is to be met with, as a sign of habitation not a speck of cultivated ground. All is morass and wilderness, amongst which trees of amazing height force their way upwards, and the silence of the forest is seldom disturbed by the traces or presence of animal life. The small river (a branch of the Sambas) presents at its frequent windings most lovely prospects often not less remarkable for their fantastic forms than for their tropical luxuriance. There is the home of the orangutan (Malay—*orang* man, *utan* forest), and of thousands of smaller apes, here the buzzing of myriads of insects unites with the song or divers noises of birds, whilst dangerous crocodiles lurk for their prey amongst the water-plants on the banks."

The country between the river Sambas and the already mentioned river Duri is intersected by numerous small streams, most of them having their sources in the Mandor districts.

Amongst these and further inland the Chinese Settlements are spread about, the inhabitants of

* Kiri and Kanan are the Malay words for right and left.

which are occupied in the cultivation of rice near the coast. This district is considered the most productive in the western division; still further, inland, the dwellings of the Chinese who are employed in mining operations are met with. This is the scene where the sanguinary drama of the Mandhor insurrection was enacted, which originated in the obstinate resistance of the Chinese "Kongsis" against the steady extension of the Netherlands authority.

The connexion of Netherlands with Sambas is of ancient date. The first treaty with this State was concluded by the East India Company in 1609, and stipulated chiefly that the Company would defend the Sultan against all foreign enemies, particularly against the Spaniards and Portuguese. The Sultan on his side engaging to exclude all other European nations from intercourse with his country, and to concede the exclusive right to free trade with his State to the Netherlanders, with the right to build a fort for the protection of their persons and possessions, and ensuring them the monolopy of the diamond trade from which even the native traders were excluded. In 1816,* after the restitution of our Eastern possessions by England a new agreement was made with the Sultan, by which he recognized the sovereignty of Netherlands, and ceded all the revenues of his Sultanate and of its tributary states to the Government, in return for which he was to be paid a fixed income, the amount of which depended on tho full tax levied on the Chinese and on the Dayaks. In 1819 this arrangement underwent further changes, containing amongst other stipulations a clause by which the Government was placed altogether in the power of the Netherlands. After further amplifications and renewals, the present existing Charter was established in 1848 with the following principal clauses:—The State of Sambas forms an integral portion of Netherlands India, and is immediately under the authority of the King of the Netherlands, locally represented by the Governor-General, and accepts his State as a fief from the supreme government and exercises authority in concert with officials appointed by the Government. The successor to the throne according to adat (ancient custom) is elected, the election being subject to the approval of the Governor-General; all the revenues including the poll-tax paid by the Chinese, rents, customs and public property of all kinds belong to Government, the Sultan receives an allowance of R12,000 guldens a year (12 guldens being equal to £1 at par). In the interior of the State the Sultan is bound to provide reasonable maintenance for all the members of the princely family, the village contribution of labor shall be at tho disposal of Government for the public service; the Sultan is to appoint the native chiefs in accordance with custom, and in consultation with the chief Netherlands official, he is to maintain law and justice; afford all help to the law courts and to the police, and decide minor matters of police and justice. Europeans, Chinese and foreign Easterns are subject to the legal authority of the Government.

The Sultan will do all that is possible to suppress "head cutting"† the slavetrade, piracy on the sea and coast; he will do all he can to abolish the pawning, system, and will give all practicable aid to encourage trade, navigation and all useful branches of industry; and to render the utmost help in case of shipwreck, and to shipwrecked persons; he will not enter into any compact with foreign princes or people, or permit them to establish themselves in his State, but will give intimation to the Netherlands authorities immediately on the occurrence of any attempt at so doing. He binds himself on oath in writing to fidelity to the King of the Netherlands; and lastly, he acknowledges a debt on his State to Netherland of f48,080, and will submit to all such measures which the Government may deem necessary for the recovery thereof. As may be seen from the foregoing, Sambas is a well-regulated State, in which the security of person and property is as well guarded as in any European country. The present Resident, Heer J. van Nieuwkuijk, lately replaced by the Heer Tromp, both most excellent men, and the present Sultan Mohamed Tsafiudin, Knight of the Netherlands Lion, an enlightened man, do their utmost to promote the welfare of the country.

As we have already mentioned, there are many persons desirous of establishing themselves in Sambas for the purpose of cultivating the ground as well as for working gold mines. Up to the present time the latter pursuit has been exclusively in the hands of the Chinese, whose appliances are of the most primitive nature, yes they are the people in whose footsteps Europeans are about to tread. Applications for concessions have for some time past been pouring in. Thirty-three mining concessions have already been granted, but of these only three have passed into formal contracts. The others remain still, only permits to examine the ground in order to ascertain its adaptability for the proposed purpose. This examination, as we have already said, lasts only for three years, at the end of which period it must be changed for a notarial deed, or be given up. As soon as a contract has been signed, the rent becomes payable, at an annual rate of 10 cents per bouw and 2½ per cent on the gross produce. So that those who enter into the contracts naturally limit the extent of the concession to the land which has been found absolutely necessary.

We have just said that hitherto the gold was colleeted principally by Chinese who obtained it chiefly by washing, being ignorant of any other mode of working the quartz reefs. These gold washings are situated on the slopes of hills or in their immediate neighbourhood, and are connected with a flow of water which is essentially necessary for the work. When a site has been selected, every effort is made to turn a sufficient supply of water into it, no trouble or expense being spared in the construction of an efficient watercourse.

The nature of the gold deposit, whether mixt with sand, incorporated with quartz or in veins, necessitates the adoption of different processes for its collection. The Dayak goes to work in the most simple manner. When the burong (bird in Malay) Soho has indicated to him where the gold lies, he washes away the earth in a wooden trough until nothing remains but the particles of gold. The Malay goes a step further; he digs a pit, and gathers all the gravel and earth, and washes it out, whilst the Chinaman goes to work in different ways, according to the formation of the site. If the gold stratum lies above the level of the water, and if the water supply is sufficient, as is the case near Pagong in Montrado, all the surface earth is dug away, and the stratum of gravel or silt thus exposed is carefully washed in broad wooden *kotaks* (troughs) arranged in steps, then removed into small tubs and rinsed, and from the residue the particles of iron ore are removed by means of a magnet.

Where the gold containing silt lies below water level a sufficient number of channels are dug, which are kept dry by means of a (tali-ayar) water-rope acting like a chain pump. As soon as the sought-for stratum is reached, it is removed gradually into troughs, and washed until the gold is separated. Should the gold lie in veins, the stratum through which the veins run is broken into pieces with sledge hammers, until the depth of water puts a stop to the process, the ore is then picked out and reduced to

* Which had been held since 1811.—*Note by Translator.*

† Potong-kapala, a time-honored institution amongst the Dayaks, is a kind of duel in which two men at a time engage in a fight with heavy swords, sharp as razors, the delicate attention of each is confined to the endeavour to chop off the head of his opponent; other wounds are not allowed to count, so the entertainment goes on until one of the players loses his head and the game at the same time. Until "the grinding tyranny of tho Dutch" interfered these exhibitions afforded great amusement to crowds on all State occasions; in the case of the combatants it used to be considered, that the more the merrier, and a successful stroke of the gollok or razor-like sword was "mighty pleasant to behold."—*Note by Translator.*

powder in wooden mortars, and then washed. It need hardly be pointed out that in this last method there is much gold lost: in the first place, the sorting of the ore is done by the eye; secondly, the appliances are of the roughest kind and very inefficient; thirdly, it is only practicable to a very little depth.

The European engineers will manage matters better. A large quantity of machinery has already been introduced. That the gold strata are frequently rich is evidenced by the amount of gold produced with very defective appliances and most clumsy methods by the Chinese, who obtain as much as yields about 200,000 guldens (or guilders) a year. With the method described they get 0·012 per cent of gold from the quartz.

If the above data are not exaggerated, colossal results may be looked for; even if the proportion of gold should turn out to be only one-third of what it is said to be, the mines will be well worth the trouble and expense of working, and with good management will yield considerable profits.

AGRICULTURAL UNDERTAKINGS.

Thus far we have confined our observations exclusively to mining enterprize; we now propose to consider the question of the application that have been made with reference to the extension of cultivation in these regions.

The number of persons desirous of obtaining land for agricultural purposes is also great. The newspapers from India give us the names of those who from time to time continue to swell the list of proposed agriculturists, and so it will go on until all the western division shall be parceled out.

In Sambas alone 55 concessions have been granted, of which 25 have been confirmed by contract entered into. That more contracts have not been made is explained by the fact that within a year after the completion of the contract, the rent becomes due for 10,000 bouws, 2,000 guldens is the sum that has to be paid as rent, for the second year 4,000, for the third year 6,000, for the fourth year 8,000, and for the fifth year 10,000, without any regard to the fitness of the land for the proposed cultivation or to the circumstance of its being uncultivated. [The contractor has to pay the stipulated rent whether he cultivates or not.—*Note by Translator.*]

Of the twenty-five concessionists who have passed over this difficulty, many of them are members of a Syndicate at Singapore, the name of which does not appear in connexion with the undertaking. The contracts are in favor of the person who enters into them. Amongst these there are several who have begun to work on their own account.

The produce of the cultivation thus begun is up to the present time not very satisfactory. The reason for this is to be sought, not so much in the constitution of the soil, as in the great difficulties which the planters have to overcome. In proof of this, may be mentioned that two persons who are members of the Syndicate have produced tobacco of excellent quality, which was received in town with high approval, but that an outlay of 80,000 guldens was made before the result was obtained.

Another concessionary established a tobacco enterprize on a large scale, which according to Heer K. (*Bat. Nieuwsblad*, 15th July 1890), promises very well, but he had his full share of troubles. In the first place he could not obtain sufficient labor. The Chinese coolies displayed gross ignorance as cultivators, as well as unwillingness, and when at last help came from Singapore, it was found to be of little use. Shoemakers, tailors and clerks were sent, but no people who knew anything of planting. These were soon found to be very difficult to manage, and were continually deserting. To trust exclusively to Dayak laborers, seemed to him to offer as little hope of success. He has therefore endeavoured to engage a better class of Chinese work people.

But all this does not disprove the assertion that Sambas has very certainly a good future, if these difficulties can be removed out of the way. More than once has the soil of this region been examined, and the conclusion has always been arrived at, that it must be regarded as in every respect most favourable for cultivation. The soil has been found well adapted for the planting of sugarcane, tobacco, coffee, rice, pepper and many other products, whilst there is a great variety of good timber ready to hand, which will amply repay the cost of felling and transport.

We furnish the above as explanatory of the map which accompanies this number.

As will be seen by the map, Sambas is very favourably situated. It should be remembered that the divisions there marked indicate chiefly the lots where permission has been awarded for mining inspections, or for which requests have been tendered for concessions for cultivation. Only one contract has been entered on to the south, 20 miles from Sambas, when Heer P. van Dijk has commenced operations. Further south, near Mentrado, Mr. Gordon has brought a tract of land under cultivation on similar terms, and a little further north Mr. Liddolow has in like manner commenced operations near Benkajang; whilst twenty-five cultivators have contracted.

Too much importance should not be attached to the absence of the names of many of the concessionists; in a latter map of concessions, for it is more than probable that many of those whose names now appear on the map, may withdraw from the undertakings. Our readers are not to consider this article as written for the purpose of urging the cultivation of Sambas, or for encouraging the enterprize. Our only object is to convey a correct idea of the present condition of the country, and nothing more. It is certain that great expectations are entertained regarding Sambas. It is said even that applications have been mdo to the Sultan for the formation of a railway, but we are not in possession of any particulars.

CULTIVATION OF FIBROUS PLANTS IN CEYLON.

Our correspondent, W. A. D. S., mentions in his last letter the fact that the stem of the Bandakai yields a good fibre. We think that fact is well known, but what is necessary to turn it to useful account is the quantity and cost of the fibre produced by the plant. In other words, the information wanted is the economic value of the plant for the production of fibre. Capital is a scarce commodity in Ceylon, especially amongst those people who are most in need of new industrial resources. Such persons are not likely to be attracted to risk their slender means in experiments with plants of which they know only vague and indefinite possibilities. They want some fair prospect of gain, based upon ascertained results, not on mere chances. In countries where there is a large amount of unemployed capital seeking investment, the case is different, but even there it is not easy to induce people to make experiments otherwise than upon definite estimates of profit. In this country the only chance of obtaining a satisfactory trial of a new product rests with the School of Agriculture, or other similar institutions possessing means of experimenting independently of a remunerative result. It is quite possible that the Bandakai plant might yield fibre profitably, but our correspondent, W. A. D. S., does not give any data for estimating the economic value of the plant for its fibre, and therefore leaves the matter practically just where he found it.

The same may be said of the Sunflower plant as of Bandakai, namely, that it yields a strong and serviceable fibre, as well as an abundant crop of nutritious seed, but the fact that both these plants are extensively cultivated for their fruit, and not for the fibre they are well known to contain, tends to show that the fruit is a more valuable product than the fibre. We think the School of Agriculture would do a good service by testing the value of both these plants for the fibre they yield. The result of their experiments would be valuable, if not conclusive as to the question whether either would pay for fibre cultivation in Ceylon. In the meantime, we could not advise the expend-

iture of capital on either by anyone who could not afford to risk a loss by the venture.

The Niyanda fibre is superior to either of those just mentioned. It is of great strength and flexibility, and is of beautiful texture. It is not cultivated anywhere, so far as we are aware, but grows wild in some parts of the Island, and is largely employed by natives, who collect it and prepare the fibre for mats and other useful articles. Whether it would repay regular cultivation is, however, just what we should have expected our practical friend, W. A. D. S., would tell us. In the absence of the necessary data by which to estimate the chance of successful cultivation, it must be relegated to the same category as the two plants first mentioned. Over them, however, it has the advantage of being already in considerable use, and of therefore possessing a certain economic value.

Hitherto, notwithstanding the large number of fibre producing plants that grow freely in this island, and the high value of the fibre some of them produce, the attempts that have hitherto been made to produce fibre, as a commercial enterprize, have resulted unfavourably, except in regard to Coir and Kitool fibre, which we number amongst our regular exports.

Aloes, plantains, and other plants have been repeatedly and extensively tried, without success. Cotton promises to do well, and possibly some other of the numerous plants that are profitably cultivated elsewhere may hereafter be cultivated successfully in Ceylon, but the difficulty as regards nearly all of them, is to free the fibre from the pulp in which it is formed. This is not peculiar to the plants of Ceylon, but is common to nearly all. The separation and cleansing of the fibre is therefore in almost all cases the chief part of the work, and the essential feature of success in regard to the profitable production of fibre.

It is possible that the forcing climate of this island may cause the fibres that are formed in the tissues of the plants that produce them to adhere more closely to those tissues than in countries where growth is periodically interrupted by winter or other change of season. Be that as it may, the art of separating and cleansing the fibres of Ceylon-grown plants has not hitherto been successfully acquired, and until that cardial difficulty is overcome, the cultivation of fibrous plants is not likely to be remunerative.

Considering the importance of the subject, as shown by the magnitude of the jute industry in India, the extensive coir manufactures of this Island, and other similar industries, it is one to which the School of Agriculture might give particular attention, especially as the students possess the advantage of a chemical laboratory and a fair elementary knowledge of the science of chemistry, which may be expected to suggest or to supply solvents suitable to aid in the process of separating the fibres from the pulp in which they are formed.

It may be here remarked that the failure of sugar as a profitable product, in all those parts of Ceylon where the cane has been cultivated, is due to the forcing climate and its influence in promoting an uninterrupted growth. The ripening process, in which the saccharine is formed, is unduly delayed for want of an effective check to the flow of sap. The experience of the past attempts to cultivate sugar profitably in Ceylon suggest that any future trial should be made in parts of the Island where there is a definite growing season and a marked period of comparative stagnation of growth. Possibly; the same may apply to the cultivation of those plants in which the fibre is formed in the substance of the tissues. Here again, the School of Agriculture could do good service by making trials in some of the numerous stations where they carry on their useful and practical operations in different parts of the Island.—Local "Independent."

PLANTING IN GUATEMALA.

Sarsaparilla.—Among the products which find shipment from the Atlantic coast, of which the town of Livingston is the port, sarsaparilla should be mentioned. The exports of this article during 1887 were 51,311 lb. This product was in such demand at one time, and commanded such good prices, that the natives gave up almost every other kind of employment and devoted themselves entirely to its production. During the past two years, however, the price has receded by one-half, and the demand has largely fallen off. It grows readily from cuttings of the indigenous vine, and, as the natural supply is giving out on account of careless digging, it is possible that the cultivation could be made profitable, even at the present low prices.

Drug Cultivation.—The Government is offering a good many inducements to agriculturists to take up the cultivation of economic plants, including many varieties of drugs. Anyone desirous of cultivating sarsaparilla, rubber, or cacao, and not having land for the purpose, can, on requisition, be put in possession of a suitable lot. The following rewards are offered to agriculturists who at the end of eight years can show healthy plantations of cinchona (calisaya or succirubra):—154*l*. for 1,000 plants eight years old to the first cultivator, 77*l*. to the second, 36*l*. 10*s*. to the third, and 15*l*. 10*s*. to all others. A premium of 4*l*. for a term of three years is given for every 150 lb. of indigo grown and made in the country, and at the end of ten years after commencing the cultivation a reward of 11*l* 10*s*. for every thousand gum trees planted out, of five years old.

Cochineal.—The industry of cochineal-raising has almost entirely disappeared from the country. For thirty years cochineal was the principal article of export, but now what little is grown is used for native consumption.

Coca.—A quantity of coca seed was imported from Peru in 1888, for distribution among the people in a suitable zone for its growth; but the result was unsatisfactory, from the bad quality of the seed, and fresh means are being taken to extend the cultivation of this plant.

Pepper and Cinnamon.—Pepper and cinnamon are grown in the department of Alta Verapaz; good seed has been imported from Ceylon, and planting is extending in the fertile district, while good results have also been obtained in the department of Escuintla, where a few plantations have been made.

Vanilla, Cinchona, &c.—The vanilla plant grows wild on the mountains all over the country. The quantity of the vanilla is good, but though it figures as an export it is not cultivated for that purpose. Peruvian bark has proved a failure, and the cost of introducing the tree has been practically lost. Indigo works are subsiding in the country; a few still exist in the east, but though means are taken to encourage them, only 93*l*. of indigo was exported in 1888.—*Chemist and Druggist.*

EUCALYPTUS GLOBULUS.

Of all the 150 varieties of eucalyptus, the common blue gum is the most useful and the most important tree for Southern California. It does not thrive in Florida; the cold spells of winter cut it down or stunt its growth; but on the Pacific Coast, from Eureka to Tia Juana, a distance of 800 miles it is a stately, mighty advance agent of our now civilization. Twenty years ago our plains were absolutely treeless—desert-like, parched and brown, lifeless almost—a picture of despair. Then the first boxes of seedlings were imported from Australia and sold at the public auction in San Francisco, at $5 a tree.

Today the precious little giants sell for one cent a tree. Remi Nadeau, a recently departed genius deeply regretted by his friends, was one of the first men to appreciate the value of the eucalyptus as a fuel tree. He conceived and executed the gigantic project of planting 1,200 acres of sandy land at Florence to blue gums. Over one million trees in one plantation! To-day is a stately forest of mighty trees, towering tall and straight 150 feet, a monument to the enterprise of our bygone friend. Every third year the trees are cut down, yielding 60 cords of 4 foot wood to the acre, worth $6 to $7 a cord standing, or $7 to $8 cut and corded; the net income is therefore $420 for

the three years or $140 an acre per year. And every time these are cut, a new forest springs up from the old stumps, and there is no expense to be incurred after the first year for either plowing, cultivating or irrigating, for deep down into hidden water courses in the earth does the blue gum send down its thirsty roots, even thirty feet where the water is so far below the surface; and it makes its giant growth in the poorest sandy wastes of our river washes, drawing its sustenance from the atmosphere through its wealth of evergreen leaves. What a perfume, what a tonic is inhaled by the beautiful foliage of the eucalyptus when night brings rest and coolness to our plains. Fevers lose their terror and malaria departs with a creeping horror, where the rustling, whispering groves of stately eucalyptus waft fragrance over the home. Pour boiling water over the blue gum leaves and drink the powerful tonic. It is equal to quinine to dispel the terrors of sickness. The contagious atmosphere of the sick room today is cleaned by sprinking on the floor of an essential oil "Eucalyptole," extracted by the science of the chemist from the resinous leaves of *eucalyptus globulus* or *eucalyptus amygdalina*. Years ago winds swept over our treeless, unresisting plains. The "Northers" were a terror to the farmer and orchardist. Today miles of eucalyptus surround our fields, line our avenues and encircle our orchards. They act as powerful wind-breaks, protect the tender buds of our fruit trees from the March winds, and yield an abundance of fuel, where of yore the shiftless Mexican vainly hunted for dried manure or brea to light his smoky fire. Stranger, imagine the beauty of our avenues of blue gums twenty or a hundred years from now, when the trees average over 200 feet in length, over 15 feet in diameter, as they do today in their native land, Australia. Our southern plains will rival then the wonders of the Yosemite in their big trees. The question of fuel and timber supply is becoming more serious, more important from year to year on the Pacific Coast, as the giant redwood yields to the greedy axe of the all-absorbing lumber trusts.

If you own any lots or acres that are idle or unproductive, plant them in blue gum. A town lot 50 x 150 feet will grow 200 trees 6 feet apart, and every tree when 5 years old, is worth $1·50 for fuel in a city. Your lot thus yields $300 in five years or $60 a year, and fifty acres in blue gums will yield you an annual income of $7,000. The mayor of Los Angeles is planting 150 acres of blue gums this season; they will yield him a handsome revenue a few years hence. The mighty forest will be an object of beauty to behold and a source of perpetual income to his heirs. Let the good work proceed of planting the beautiful blue gum in forests for fuel, around orchards and fields, for wind breaks and for ornament in sightly avenues, affording shade and shelter along our streets —*Rural Californian*.

THE COST OF GROUND PEPPER AND THE ADULTERATION ACTS.

At the public sales this week light shelly Penang Black Pepper has been sold at the price of 4¼d. per lb., the lowest point that has been touched for a long time past. According to the test analysis published in the catalogue (as is now usual for Penang Black Pepper, under the recent arrival contract form), this parcel weighed 3lb. 7½ oz. per gallon, and contained 4·53 per cent of dust, &c. The following are the regulations in the arrival contract form which regulate this analysis:—

"(1) The following to be the standards of quality:—Class A, Heavy, weighing 4lb. 13 oz. per gallon measure; B, Fair, weighing 4lb. 5 oz. per gallon measure; C, Fair Merchantable, weighing 3lb. 13 oz. per gallon measure; D, Light, weighing 3 lb. 5 oz. per gallon measure=Dust 3 per cent.

"(2) The term dust to include stalks, stones, clay, and other foreign matter.

"(3) For the purpose of ascertaining the proportion of dust, 5 per cent. of each mark shall, in the first instance, be sifted through a No. 9½ sieve, in galvanised iron with round holes (one of which is held by the General Produce Brokers' Association). Of the sifted Pepper fifty pounds of each mark shall be hand-picked free from stalks, stones, clay, and other foreign matter, and the percentage of impurities so found shall be added to the percentage of dust as ascertained by sifting. These operations to be performed by one of the customary docks or wharves.

"(4) Should the Pepper be found to contain more than 3 per cent. of dust, any excess up to 2 per cent. shall be treated as valueless, and allowed to the buyer. Should the additional 2 per cent. be exceeded, the buyer shall have the option of taking the Pepper with allowance for any dust in excess of 3 per cent., or of invoicing back the parcel to the seller at the fair market value of the day of the quality contracted for, plus a fine of not less than 2 per cent., and not more than 10 per cent., the value and fine to be fixed by arbitration in the usual manner. Any fraction below half per cent. to be neglected, any greater fraction to carry the next higher integral.

"(5) For the purpose of asertaining the weight of a parcel, the average sample taken by the Dock Company or Wharfingers shall first be freed from dust and other impurities, and then filled into a gallon measure, shaken down as closely as possible without pressure, and struck off and weighed, the average of three fillings to be taken for 25 tons or less. This operation to be performed by the selling Brokers, who shall state the separate weights of the three tests on the out-turn accounts.

"(6) In the event of seller or buyer being dissatisfied with the return of the weighing by the selling Brokers, either of them shall have the option, within a week from the date of the first selling Broker's return, of calling for a fresh average sample to be drawn, and the matter shall be referred to arbitration. The arbitrators to test both the landing and re-drawn samples, and the testings to be averaged, and the result to be considered final. Should the Pepper have been re-shipped before a fresh sample is asked for, the first weighing shall be taken as final.

"(7) Should the Pepper be found to weigh less than the minimum of the class named, the buyer shall take the same with an allowance of one quarter per cent. on the sale price for the first ounce or fraction of an ounce, and a further one-half per cent. for the second ounce or fraction over an ounce, but should the deficiency in weight exceed two ounces, the Pepper to be invoiced back to the seller at the fair market value of the day, of the quality contracted for plus a fine of not less than 2 per cent., and not more than 10 per cent., the value and fine to be fixed by arbitration in the usual manner.

"(8) Samples to be drawn of not less than 28lb for parcels of 25 tons or less. In case a second sample be required, half of the total quantity drawn to be returned to the bulk."

No machine has yet been invented which will entirely remove earth or sandy matter from Pepper, and, in fact, practical experience shows that in some cases screening or brushing machines, by the forcible pressure used in this process, do harm instead of good, by breaking up pellets of earthy or clayey matter that a sieve would to a great extent remove unbroken. The only plan that the trade can adopt, therefore, to avoid risk of prosecution under the Adulteration Act, is to buy whole Pepper as free from dust and dirt as possible, and the analyses published with each parcel of Penang Black enable them to a great degree to do this. It appears, however, that the test analyses carried out by the London docks and wharves do not mean that all the dusty matter consists of sand and earth.

Penang Black Pepper is more largely used for grinding than other descriptions and heavy Acheen can now be bought at 5d. per lb., and West Coast Penang, which is heavier Pepper, at 5¼d. to 5½d. per lb., according to weight per gallon and percentage of dust. In the best cases the percentage of the latter would be 2 to 2½ per cent. The cost of grinding, including barrels, and loss in weight in grinding

and between warrant weights and re-weights, would add ½d. to ⅝d. per lb. for expenses, without any profit to the wholesale dealer. The usual charge for grinding and barrels is ⅜d. per lb., and there is a considerable loss between warrant and delivery weights, and a further loss of weight in grinding. In our opinion, Penang Pepper with 2 per cent. to 3 per cent. of dust is the lowest quality which it is desirable to grind, if the public are to have pure Pepper. The first cost without profit to the dealer of this quality just now is about 5⅞d. to 6⅛d. per lb., ground and packed in 1 cwt barrels. The finer qualities of Black Pepper, such as Tollicherry, Alleppy, and Malabar are selling whole on the Market at 6¼d. to 6½d. per lb. If barrels are seperately charged for (which is not, however, usual in the Spice trade), a corresponding reduction could be made in the quoted price.

It is well for the retail trade to have those undoubted facts clearly in view, for, with the infinitesimal difference the sale of doubtful Pepper could possibly make to them in the course of the year, the risk of a prosecution, and possible conviction, for selling adulterated goods, is obviously not worth running: even if they desired to take such a risk, which is not the case by any means. Indeed, in the "poivrette" and other cases, the retailers undoubtedly bought in entire ignorance of the adulteration. Nor would a guarantee from the wholesale grinders or dealers that the Pepper was pure be much satisfaction to a self-respecting man if he found that adulterated Pepper had been sold to him, under the proper price for a genuine article.

It is true that, instead of selling Ground Pepper at ½d. to ⅝d. per lb. *above* the cost of the whole corns, which is the lowest legitimate margin, Ground Pepper is habitually sold at about 1½d. per lb. *below* the first cost of the whole, or apparently about 1½d. under its proper relative value. When buyers purchase Ground Pepper at prices apparently below those that are practicable, it would be a good plan if they asked for samples of the Whole Pepper used, and insisted on being supplied at the same time with an equivalent parcel of whole Pepper, at say, ½d. under the ground price. Such quotations are explained by the parcel consisting wholly, or in great part, of the husks given by the process of decortication of Black Pepper. These are produced when the outer shell of Black Pepper is mechanically removed in order to make White Pepper from the Black Pepper corns. How far the sale of ground husks as Ground Black Pepper, is legal, without a declaration to that effect, has not been settled nor has it been decided whether the public analysts would pass husks as Pepper. The husks in any case must contain a very much greater percentage of the dirt that was originally in the parcels, and the buyers would thus run more risk with them than with parcels ground from the whole Pepper as imported. In the meantime the retail grocers may feel perfectly certain that if they are offered ground Black Pepper, at present market values, under 6d. to 6¼. per lb., that it is either sold at a loss, or that dirty whole Pepper has been used, or that husks have been mixed with it, or that it consists of husks altogether. In the present state of the law there seems no objection to the admixture of husks, so long as the buyer knows the fact.

It is satisfactory to find that the action taken some time back has stopped the admixture and adulteration of White Pepper with the so-called "Long" Pepper, The price of the latter has fallen to about 25s. per cwt., at which under, its own name, the Spice in question has a legitimate sale and use. When used for adulteration the value was run up to 70s.

A good deal of almost open adulteration, is still carried on by mixing ground Rice, worth say 1¼d. to 1½d. per lb., with White Pepper. This admixture if carried to any great extent can be detected by the dirty, greyish tint, and also by the weight of the sample, ground Rice being heavier than pure Pepper. A strong magnifying glass or weak microscope at once shows this adulteration, as the Rice grains look like bits of quartz or camphor in the Pepper. A further test is to pour boiling water on two samples, one the suspected one, and one of real ground White Pepper. The difference in the aroma of a sample adulterated with Rice Flour can at once be detected, and the latter also often goes into a starchy pulp or into a more solid mass.—*Produce Markets' Review.*

ECHOES OF SCIENCE.

Whether or not a plant draws the nitrogen it requires to form its tissues directly from the atmosphere, is a question which has been much debated. Herren Hellriegel and Wilfarth, two German chemists, have already shown that seeds sown in calcined soil produce only puny plants, having little nitrogen in their substance, but if they are watered with a few drops which have drained from a vegetable mould they begin to prosper, and secrete nitrogen which apparently can only come from the atmosphere. The water supplies it appears, the microbe necessary to abstract the nitrogen from the air. M M. Schlœsing and Laurent, two skilful French chemists, have now put the question beyond all reasonable doubt by a memoir read before the Académie des Sciences, Paris.

They have found by careful experiments on plants grown in a confined atmosphere, that these abstracted nitrogen from the air around them to the extent of 30 cubic centimetres, and analysis of the plants practically rendered this quantity back again. M. Laurent has also succeeded in cultivating the microbe which fixes the nitrogen and defined the conditions of its existence. The most unexpected fact brought out is that this proto-organism flourishes above all in a medium deprived of nitrogen in combination; nitrates in particular appear to hinder its development.—*Globe.*

NOTES ON POPULAR SCIENCE.

By Dr. J. E. Taylor, F.L.S., F.G.S., &c.,
Editor of "Science Gossip."

There is only one agent we are acquainted with which will in a great degree replace the energy produced by the consumption of coal—ELECTRICITY. At present we generate it chiefly from coal, although it can of course be produced by chemical action. But there are certain great mechanical forces in the world, generated by solar energy now, just as coal originally was. The first of these is the wind. Few people have formed an idea of its enormous and as yet unused energy, except in the case of our ancient and picturesque windmill. But the windmill is an archæological suggestion of a future rescue. Imagine a head of wind a mile across and a hundred feet in height—the latter a mere trifle. Then multiply this by the force moving over the path it takes. There are millions of horse-power represented thereby. Irregular in its action though the wind is proverbially said to be, our storage batteries (as yet but in the infancy of their development) can accumulate much of this now almost wasted energy. The latter can be stored and drawn upon at pleasure. Further, think of the as yet almost unused energy represented by streams, especially tidal rivers. One of our chief electrical engineers has shown that the phenomenally high tide of the Severn, coming and going twice a day, represents more energy than all the cotton mills in Lancashire and Yorkshire. The Americans have already commercially and scientifically formulated a scheme for utilising Niagara. Some day, perhaps, somebody will formulate a method for enlisting the energy of the tides all over the world in the service of man. The energy represented by the vast consumption of coal every year in every part of the globe is a mere trifle compared with the energy of moving wind, flowing streams, descending waterfalls and cataracts, and the always certain ebbing and flowing tides. A French engineer is already making propositions to supply electric power to Paris by utilising the ebbing and flowing tides of the coast; and he is constructing, at Havre, two large basins, into one of which the sea at flood-tide will flow over a dam, whilst during ebb it will flow out of the

other dam into the sea again. There is a similar antiquated dam on a very small scale at Woodbridge, in Suffolk, only it turns a mill-wheel instead of working a dynamo.

A new and ingenious milking machine is being tried at the Duke of Portland's dairy farm. It is a simple contrivance, being merely an iron pipe and a hand-pump. Connected with the pipe is a length of indiarubber tubing. The latter has teat-cups for clasping the cow's teats in such a manner as to be air-tight. When the cups are applied to the "coo," the pump can be worked by a lad, the air exhausted, and the milk drawn from the animal, all four teats giving out at hte same time. The cow is thus milked dry in about eight minutes, and is said to behave herself decently during the operation.—*Australasian.*

JAPAN is about to enter the field as a producer of indigo. The soil and climate of parts of the island are stated to be favorable to the cultivation of the shrub.—*American Grocer.*

TWENTY or thirty Europeans and about two thousand Africans are working on the Congo railway to Stanley Pool. It is thought that the railroad will suppress the slave trade better than the army.—*Ibid.*

Rev. Dr. E. E. Hale, in the *Commonwealth*, suggests that cheap sugar may drive out the taste for whiskey. It supplies the hydro-carbon needed to take the place of whiskey. He says that the Spaniards are addicted to the use, almost every hour, of sugar and water as a beverage.—*Ibid.*

OUR EXPORTS.—As much as 892,984 lb. of tea, 661 cwt. coffee, 111 cwt. cocoa, 12,446 lb. cinchona bark, 3,353 cwt. coconut oil, 1,601 cwt. plumbago, 14,720 lb. cardamoms and no cinnamon (nor "chips") sum up the week's exports in Ceylon products. We suppose there must be some further additions to be made before 1890 season is closed: we ask because Messrs. Forbes & Walker in their circular the other day gave 46,310,295 lb. as the total export of tea for 1890, whereas the Chamber today only make up 45 943,469 lb.

RINGING TREES.—Hartig gives the following account of his experiments in ringing the bark from trees. Trees from which a ring of bark has been taken are affected differently, according to the kind of tree, and the thickness of the trunks. Some die rapidly, while others remain alive a long time. The author has already expressed his opinion that most likely root-structure has considerable influence on plants submitted to this operation, and any prognostications as to the probable effects must be guided by the fusions or inosculations which may have taken place between the roots of the tree under treatment and those of the untouched trees around. If the roots, after the cessation of nourishment, and of growth, and the formation of new rootlets, soon lose the faculty of absorbing water and mineral substances (Pine, Spruce Fir, &c.) from the soil, the death of the plant must be the direct consequence of the operation, unless there are underground unions with the roots of neighbouring trees by which life is sustained until the dead part of the trunk becomes impermeable to water. But if the roots do not entirely lose the power of absorbing water even in their oldest parts—as in the case of Maples, Lime trees, &c.—the trees continue to thrive without underground union so long as the denuded trunk is in a fit state to allow of the passage of water. The following interesting example will therefore be easily understood. A Spruce Fir tree a hundred years old, divided at a height of about twenty-three feet from the ground into two almost equal trunks. In 1871 a complete ring of bark was removed from one of these trunks. The tree was cut down in the winter of 1888—9; the two crowns were quite green, those of the ring side being rather less abundantly provided with leaves. The roots of the injured side had ceased to grow but in spite of that, the ringed branch continue to grow for seventeen years, nourished by the roots of the uninjured side.—"*Annales Agronomiques*," Nov. 25, 1890, p. 526.—*Gardeners' Chronicle.*

SAVE ALL THE WOOD ASHES made on the farm and buy more from the neighbours. They will make an excellent fertilizer for onions, and are beneficial to all fruit trees, no matter on what soil they may be growing. Coal ashes, also, are said to be valuable, not only for walks, but to mix with hard, stiff soils, to which they give a softer and more porous nature.—*Indian Agriculturist.*

A CANADIAN DAIRYMAN describes a plan by which he gives his calves fresh new milk, and yet manages to have a good supply of butter from his milk. The idea is simple enough, and well worth consideration. The plan adopted is as follows: At milking time two large vessels are put outside the byre door, one marked "dairy" and the other "calves." One half of the milk given by each cow, viz., that first drawn, is put into the vessel marked "calves," and the other half, viz., that last drawn, is put into the vessel marked "dairy." This latter half is found, on being tested, to contain from two thirds to three-fourths of the cream. The calves have the advantage of being fed with milk warm from the cow; at the same time they are reared at a moderate cost, as their allowance of milk does not contain much cream.—*Indian Agriculturist.*

CEYLON EXPORTS AND DISTRIBUTION 1891

COUNTRIES.	Coffee cwt.			Cinchona	Tea.	Cocoa	C'moms.	Cinnamon.		Coconut Oil.		P'bago.
	Plantation	N'tive	Total.	1891 B'nch &Trunk lb.	1891 lb.	cwt.	lb.	Bales lb.	Chips lb.	1891 cwt.	1890 cwt.	1891 cwt.
To United Kingdom ...	4629	4629	4629	208838	3023712	2262	15367	71565	4221	9:3	...	6734
„ Marseilles	...	...	...	...	...	39	...	6500	...	...	...	...
„ Barcelona	...	...	...	...	50	...	...	36000	...	...	...	...
„ Genoa	...	...	...	...	...	...	...	...	...	...	...	...
„ Venice	...	...	...	...	...	...	...	...	...	...	...	...
„ Trieste	372	...	372	...	...	...	...	...	...	951	...	...
„ Odessa	...	...	...	...	...	...	...	...	...	...	...	...
„ Hamburg	...	...	...	...	...	...	...	22500	...	1304	...	956
„ Antwerp	...	...	...	...	...	...	...	...	...	200	...	...
„ Bremen	...	...	...	...	...	...	...	...	...	...	...	...
„ Havre	...	...	...	...	...	...	...	...	...	...	...	...
„ Rotterdam & Amsterdam	...	...	...	21438	...	...	...	...	...	...	...	...
„ Africa	...	...	...	...	975	...	...	...	...	...	...	...
„ Mauritius and Eastward	...	...	...	...	...	...	...	...	...	...	105	...
„ India	42	...	42	...	4432	...	6064	...	...	387	990	...
„ Australia & New Zealand	211	...	211	...	119658	...	...	...	...	...	...	...
„ America	...	...	...	63025	2000	445	...	...	...	2514	..	8622
„ Stockholm	...	...	...	...	...	...	...	...	...	...	...	...
„ Constantinople ...	...	...	...	...	...	...	...	...	...	...	...	...
Total Exports from 1st Jan. to 26th Jan. 1891	5254	...	5254	293301	3150777	2746	21431	136565	4221	6339		16312
Do 1890	13080	438	13518	222941	1977297	2074	29943	80500	23598	1095		4936
Do 1889	2369	376	3645	350446	1288974	1985	12184	41040	...	10210		16965
Do 1888	6639	76	6715	485859	920271	1335	20821	44119	48341	25358		23009

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, January, 15th 1891.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White	Slightly softish to good Hard bright...	£5 10s a £7 10s
Yellow	Do. drossy & dark ditto...	95s a 110s
CINCHONA BARK--Crown per lb.	Renewed ...	4d a 10d
	Medium to fine Quill	6d a 9½d
	Spoke shavings ...	3d a 9d
	Branch ...	1d a 3d
Red	Renewed ...	2d a 10d
	Medium to good Quill...	4d a 9½d
	Spoke shavings ...	2d a 5d
	Branch ...	1d a 3d
	Twig ...	1d a 1½d
CARDAMOMS Malabar and Ceylon	Clipped, bold, bright, fine	1s 8d a 3s
	Middling, stalky and lean	10d a 1s 6d
Alleppee	Fair to fine plumpclipped	1s 4d a 3s
Tellicherry	Good to fine ...	1s 3d a 2s 3d
	Brownish ...	9d a 1s 3d
Mangalore	Good & fine, washed, bri[ght]	1s 6d a 3s 3d
Long Ceylon	Middling to good...	1s a 2s 3d
CINNAMON 1sts	Ord. to fine pale quill ...	7½d a 1s 5d
2nds	,, ,, ,, ,,	7d a 1s 3d
3rds	,, ,, ,, ,,	6¾d a 1s 2d
4ths	Woody and hard ...	5½d a 10d
Chips	Fair to fine plant...	2d a 7½d
COCOA, Ceylon ...	Bold to fino bold	108s a 119s
	Medium ...	95s a 101s
	Triage to ordinary	55s a 85s
COFFEE Ceylon Plantation	Bold to fine bold colory...	110s a 115s 6d
	Middling to fine mid. ...	104s a 107s 6d
	Low mid. and Low grown	99s a 104s 6d
	Smalls ...	96s a 103s
Native	Good ordinary ...	87s a 92s
Liberian	Small to bold ...	85s a 93s 6d
East Indian	Bold to fine bold...	105s a 115s
	Medium to fine ...	100s a 105s
	Small ...	95s a 102s
Native	Good to fine ordinary ...	87s a 92s
COIR ROPE, Ceylon & Cochin	Mid. coarse to fine straight	£14 a £20 15s
FIBRE, Brush	Ord. to fine long straight	£14 15s a £27 5s
Stuffing	Coarse to fine ...	£7 a £25
COIR YARN, Ceylon	Ordinary to superior	£15 a £30
Cochin	Ordinary to fine ...	£15 a £40
Do	Roping fair to good	£12 a £16 5s
COLOMBO ROOT sifted	Middling wormy to fine...	18s a 27s 6d
CROTON SEEDS, sifted	Fair to fine fresh...	10s a 15s
GINGER, Cochin, Cut	Good to fine bold...	50s a 70s
,,	Small and medium	37s a 45s
Rough	Fair to fine bold ...	20s a 32s
,,	Small ...	18s a 27s
GUM ARABIC, Madras...	Dark to fine pale	15s a 55s
NUX VOMICA	Fair to fine bold fresh	10s a 12s
	Small ordinary and fair...	6s a 8s 6d
MYRABOLANES, pale	Good to fine picked	10s a 11s
	Common to middling	9s 6d a 10s
	Fair Coast...	9s 9d
Pickings	Burnt and defective	4s 9d a 6s 3d
OIL, CINNAMON	Fair to fine heavy	1s a 2s 6d
CITRONELLE	Bright & good flavour ...	11-16d a ¾d
LEMON GRASS	,, ,, ,, ,,	1⅛d a 1¼d
ORCHELLA WEED	Mid. to fine, not woody...	20s a 33s
PEPPER, Malabar, blk. sifted	Fair to bold heavy	4½d a 4⅝d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	1s a 1s 1d
PLUMBAGO Lump	Fair to fine bright bold...	15s a 19s
	Middling to good small...	11s a 14s
Chips	Slight foul to fine bright	9s a 12s
dust	Ordinary to fine bright...	5s a 9s
RED WOOD ...	Fair and fine bold	£4 10s a £4 15s
SAPAN WOOD	Middling coated to good	£5 a £8
SANDAL WOOD, logs	Fair to good flavor	£30 a £58
Do. chips	Inferior to fine ...	£9 a £30
SENNA, Tinnevelly	Good to fine bold green...	4d a 8d
	Fair middling medium...	3d a 5d
	Common dark and small	1d a 2d
TURMERIC, Madras	Finger fair to fine bold	16s a 18s
Do.	Mixed middling [bright	15s a 16s
Do.	Bulbs ...	10s a 12s 6d
Cochin	Finger ...	16s a 17s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	15s a 22s
2nds	Foxy & reddish 5 a 8 ,,	12s a 16s
3rds	Lean & dry to middling under 6 inches	8s a 11s
4ths	Low, foxy, inferior and [pickings	3s a 7s
FROM BOMBAY AND ZANZIBAR.		
ALOES, Socotrine	Good and fine dry	£4 a £7
Zanzibar & Hepatic	Common and good	40s a £5 5s
CHILLIES, Zanzibar	Fair to fine bright	42s a 43s
	Ordinary and middling	35s a 38s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
CLOVES, Zanzibar and Pemba, per lb	Good and fine bright	3¾d a 4d
	Common dull to fair	3½d a 3⅝d
Stems...	Common to good	¾d a 15-16d
COCULUS INDICUS	Fair	12s a 13s
GALLS, Bussorah & Turkey ₩ cwt.	Fair to fine dark blue	52s 6d a 58s 6d
[cwt.	Good white and green...	40s a 47s 6d
GUM AMMONIACUM per	Blocky to fine clean	40s a 100s
ANIMI, washed, ₩cwt.	Picked fine pale in sorts,	£13 a £14
	part yellow and mixed	£10 a £12
	Bean & Pea size ditto	£5 a £8 10s
	amber and red bold	£10 a £11
scraped...	Medium & bold sorts	£5 a £7
ARABIC E.I. & Aden..	Sorts ...	32s a 70s
per cwt. Ghatti	Sorts to fine pale	22s a 57s 6d
Amrad cha	Good and fine pale	70s a £5 17s 6d
	Reddish to pale brown ...	25s a 55s
ASSAFŒTIDA, per cwt.	Clean fair to fine	26s a 50s
	Slightly stony and foul	16s a 25s
KINO, per cwt.	Fair to fine bright	25s a 37s 6d
MYRRH, picked ,,	Fair to fine pale	£5 a £7 10s
Aden sorts	Middling to good	62s a 80s
OLIBANUM, drop per cwt.	Fair to fine white	30s a 51s
,,	Reddish to middling	22s 6d a 27s
pickings...	Middling to good pale	12s a 19s
siftings ...	Slightly foul to fine	10s a 13s
INDIARUBBER Mozambique per lb. Ball & Sausage	red hard	1s 9½d a 2s 2d
	white softish	1s 3d a 1s 8d
	unripe root	1s a 1s 3d
	liver	1s 4d a 1s 11½d
FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per lb.	Nearly water white	4½d a 5d
2nds ,,	Fair and good pale	3¾d a 4d
3rds ,,	Brown and brownish	3¼d a 3½d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 4d
	Common foul and mixed	9d a 1s 8d
Rangoon	Fair to good clean	1s 10d a 2s 4d
Madagascar	Good to fine pinky & white	2s 2d a 2s 6d
	Fair to good black	1s 8d a 2s 10d
SAFFLOWER	Good to fine pinky	50s a 60s
	Middling to fair	40s a 45s
	Inferior and pickings	15s a 25s
TAMARINDS	Mid. to fine *black* not stony	9s 8d a 10s
	Stony and inferior	4s a 6s
FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	20s a 21s 6d
,,	Common & middling soft	12s a 19s
Natal	Fair to fine	none here
ARROWROOT Natal per lb.	Middling to fine	2d a 3d
FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ₩ cwt.	Good, pure, & dry white	157s 6d a 160s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	35s
Block [per lb.	Pressed	Nominal 30s
	Good	22s 3d
GUTTA PERCHA, genuine	Fine clean Banj & Macasar	3s 6d a 5s
Sumatra...	Barky to fair	2s a 3s 9d
Reboiled...	Common to fine clean	4d a 2s
White Borneo	Good to fine clean	2s a 3s
	Inferior and barky	1s 4d a 2s
NUTMEGS, large, per lb...	64's a 80's, garbled	2s 9d a 3s 1d
Medium	83's a 95's	2s 1d a 2s 9d
Small	100's a 160's	1s 5½d a 2s 6d
MACE, per lb.	Pale reddish to fine pale	2s 6d a 2s 11d
	Ordinary to fair	2s 2d a 2s 4d
	Chips and dark	1s 11d a 2s
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 3d a 3s 3d
	Dark ordinary & middling	8d a 1s 3d
High dried	Good to fine	1s a 1s 1d
	Dark, rough & middling	6d a 9d
SAGO, Pearl, large, ₩ cwt.	Fair to fine	13s a 14s
medium	,, ,,	11s 6d a 12s
small	,, ,, ,,	9s 6d a 11s
Flour [per lb.	Good pinky to white	9s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine	1⅞d a 2½d
Singapore	,, ,,	1-11-16d a 2d
Flour	,, ,,	9s a 15s
Pearl	Bullet, per cwt.	18s
	Medium ,,	15s 3d a 17s
	Seed ,,	16s

THE MAGAZINE

OF

THE SCHOOL OF AGRICULTURE,

COLOMBO.

Added as a Supplement monthly to the "TROPICAL AGRICULTURIST."

The following pages include the contents of the *Magazine of the School of Agriculture* for February :—

AGRICULTURE AND ENTERPRISE.

IT cannot be questioned that there is a great lack of enterprise in the south of Ceylon,—of whatever class, and more especially among the natives. There are undoubtedly cases that can be brought forward to disprove this general statement, but these are few and exceptional. Of late we have seen a number of Ceylonese leaving the Island to try their fortunes in other lands, impelled by the success of a few pioneers to imitate their example, till quite a little colony of young men has been formed in the Straits Settlements; but there is little doubt that one of the chief incentives to this action is the charm of novelty in leaving this country and journeying over the seas to visit new lands and new peoples.

Taking agriculture in its widest sense, we find very few of the Burghers of Ceylon as cultivators of the soil. It does not take long to count those who are engaged in the cultivation of tea, coffee, cocoa, coconuts, and cinnamon. Many who have gone in for these industries have proved themselves successful planters, while some have held up their heads well above the crowd. There have also been stray cases of those who have tried sheep farming, cattle and horse breeding, and tanning among the Ceylonese with more or less success: but how few compared with the hundreds that crowd the legal and medical professions, merely because these professions show beaten tracts, and because these hundreds have not the enterprise to strike out a new path for themselves.

Some time ago a native young man came to us full of the idea of starting off to America, after having read a plausible advertisement in a newspaper, with the idea of cultivating land. Of course it did not take long to dispel from his mind the gorgeous prospects he had conjured up there, from our own knowledge of the import of such advertisements; and we strongly advised him if he had any special desire for anything like colonization under difficulties, he might begin on a moderate scale by applying to the Ceylon Government for a grant of land in some neglected region of the Island, on the promise of bringing it under cultivation of paddy, cotton, dhall, Indian corn, arrowroot or the like. But with this suggestion his enthusiasm died away. Why this should have been the case it is difficult to explain, except by supposing that it was the charm of novelty more than the determination to work for one's living that was the dominating influence in this special case, and thus accounting for the fact of a youth, who had never left the shores of his Island home, conceiving the idea of travelling thousands of miles to cultivate land under, what would be to him, insuperable difficulties, rather than of carrying on similar work under more favourable circumstances in his own country for his own and his kinsmen's benefit.

There are parts of this Island in a sadly depressed state, not so much because they are incapable of supporting a population, but because all that might be done to help nature to yield her stores of food has not been done. It is not to be thought that we look upon such cultivation as an easy matter, and it must be acknowledged that it is no light task to work up lands that have been allowed (no doubt owing to objections against soil, rainfall, climate and situation) to lie neglected. Yet there is an experiment to be attempted, and an honest effort to be made, that have not yet been done. There must be some who, having come under the influence of agricultural instruction in Ceylon, have a taste for

and a fair idea of opening out and cultivating land, but who want encouragement to give them enterprise. The religious zeal that fires the Salvationist to form schemes for colonization and cultivation is not theirs. Official encouragement and aid is what is necessary to start them. Certain terms should be laid down with grants of land—not of course as grand or visionary as those of the Amercian newspaper advertisements—and the plea (an honest though a common one) of a want of capital, might be met.

If in this way a few bands of young men of an adventurous turn of mind can be got to open up the neglected areas of Ceylon, there is no reason why, with steady perseverauce and a knowledge of their work, they should not succeed in bringing relief to the indigenous population by introducing new methods of cultivation and new food products to their notice, but also in benefiting themselves.

OCCASIONAL NOTES.

We referred some time ago to the case of Mr. Jayasinghe, a student who passed out in 1888, who was engaged in opening out a very large tract of land in the South with the object of sugar-cane cultivation. Of last year's batch of boys, three or four have already started cultivation on their own lands. Mr. Abeysuriya, who since he left in Decembsr last, has been planting arecanuts, dhall, sugar-cane and Indian corn, writes that he is at present occupied in clearing an area of two hundred and seventy acres. Mr. Jayawardeue has invested in some land in the Polgahawela district which he intends to lay under coconuts and cocoa. Mr. Manchanayake is working hard at paddy cultivation, according to improved methods, in his native district of Cotta, where he also intends to cultivate vegetables on a large scale. Messrs. Cooray are co-operating with a relative in working a tea estate in the Kalutara district. This is all most encouraging, and the news comes as a pleasant surprize to us since we penned the lines regarding the want of enterprize in the natives of Ceylon. We heartily wish all these old boys the full measure of success which their pluck and perserverance will deserve. With their start in life as independent agriculturists, and the late appointments as Agricultural Instructors, both Government and private, our stock of passed men waiting for 'something to turn up' is all but exhausted.

The notes which our Agricultural Instructors were wont to send us pretty regularly in the early days of the Magazine, seldom or never reach us now. This is unfortunate both for ourselves and them: for while such notes must be of interest in a circulating medium of agricultural knowledge and news, there are ways in which we may be able to help these correspondents through the Magazine or privately. By means of regular reports (which otherwise we seldom if ever see or hear) communicated to our monthly, we shall (having no alternative of personally visiting, encouring, and advising) be always kept informed of the state of affairs agricultural at each station, and be best able to deal with special matters, when it is thought necessary to refer to us.

The idea of publishing current crop and weather reports, brought forward by the Hon. J. J. Grinlinton in the Legislative Council the other day, is a very happy one, which, morcover, has been carried out to great advantage out of Ceylon. Early information regarding matters of such a nature as brooks uo delay when interference is demanded, is very necessary. Timely notice often arrests incalculable damage or loss.

Mr. Mendis has been appointed Agricultural teacher at Prince of Wales' College, Moratuwa, where he has a large number of students, who are also being instructed in practical work. We hear that the boys evince a great interest in their agricultural studies, and take very kindly to outdoor work. It is contemplated, we believe, to start dairy work before long at the College. Our best wishes are with the Principal, Mr. Goonewardene, and the Messrs. De Soysa, the patrons of the school, that their efforts on behalf of the inhabitants of Moratuwa may be fraught with success.

Two other appointments have been made lately, viz., that of Mr. Goonewardene to Kolonna Korale, Rakwana, as a privately paid Agricultural Instructor, and of Mr. Gunesckere as teacher of agriculture in the Buddhist School at Hatton. These private appointments, coming as they do after much adverse criticism and ridicule of the instruction imparted to the students at the School of Agriculture, must be a source of great encouragement to the teachers and promoter of that institution; while at the same time it is an indication that there are those amongst us who recognise the need of improvement and reform in native agriculture, and are taking active measures to bring about so desirable a result.

There is at last some prospect, however remote, of a geological survey of the island being made. The officers of the Survey Department have been instructed to collect geological specimens from all parts of the country, and forward them with their notes to the Colombo Museum, as a first step towards a geological survey. But who is to identify and arrange the specimens at the Museum? Evidently a special officer will have to be appointed, for to judge from the present collection of rocks and minerals at the Museum, there is no one qualified for the work among the officers of that institution. The specimens now there are miserably poor in number; some have evidently not yet been identified; and what is worst of all, a good few are wrongly labelled. Even mica, which every tyro knows, is named talc; while the labels 'lemonite,' 'orthoalase,' 'grannlite' go to show that someone requires a few lessons in spelling. However, let us hope that before long our students of geology will have a collection at the Museum that will help them and not mislead them in their studies.

It is a great matter that the School of Agriculture has been chosen for the office of the Central Committee of the Imperial Institute in Ceylon,

Specimens of natural products from all parts of the Island will find a temporary home in the school, the students of which, from contact with so representative a collection as is sure to be formed, and one, moreover, which will deal largely with agricultural products, should derive incalculable benefit. It is to be hoped that it will be found practicable to have the specimens on view after they are finally classified and arranged.

Paddy growers in lower Ambagamuwa are more fortunate than the majority of their brethren. A hundred bushels an acre are not an uncommon crop there, while a cultivator who is fortunate enough to have a rest-house for cattle overlooking his fields, is reported to take in four hundred bushels off an area of three acres. Transplanting is practised in this region, but the improved plough has not yet found its way among the agriculturists. Perhaps with the appointment of Mr. Gunesekere as agricultural teacher at the Buddhist school at Hatton, there is a prospect of the new plough being introduced to the neighbouring cultivators.

A beautiful specimen of the *Acherontia Satanas*, the Sinhalese representative of the English Death's-head moth (*A. atropos*) has been received for the School Museum. The beautiful moth belongs to the family *Sphingidæ* or hawk-moths of the Lepidoptera order. The distinguishing character of this insect is a skull-like mark on its back, and from this circumstance and the squeaking sound it emits when disturbed, it it said to be regarded with much superstitious dread by the country people of England and other parts of Europe.

The caterpillar of this moth measure sometimes nearly five inches in length and is of considerable thickness. It is beautifully marked, and on the last joint of the body there is a process curving over the joint like a tail.

The following is taken from the Rev. W. W. Gill's "Life in the Southern Isles" to show the very peculiar use to which a species of the hawk-moth is put to in the Islands of the South:—"A large handsome moth called the *iriano*, or sphinx moth (*Chærocampa erotus*) is common in the Harvey Islands. . . . The silky proboscis, exquisitely coiled up, sometimes attains the length of five inches. At dusk in the warm season these insects are very numerous, coming out of their hiding places and entering the dwellings of the natives, attracted by the light inside. In ancient times a certain method of secretly wreaking vengeance upon a foe was, on a dry night to catch two or three *irianos*, and after carefully unwinding their probosces, tie on narrow strips of stout native cloth lighted at one end. This cloth only smoulders, and like touchwood never goes out. The affrighted moths would then be set at liberty as near as possible to the dwelling of the intended victim. The *irianos* dragging through the air these strips of smouldering cloth would make for the highly-combustible thatch. In a few seconds the house would be in a blaze."

INDIGENOUS FOOD PRODUCTS: CULTIVATED AND WILD.

By W. A. De Silva.

Cucurbitaceae.

42. *Trichosanthes Cucumerina*, L. Sin. Dummella.

Is a wild plant growing in the uncultivated places of the warmer parts of the Island. It generally abounds in low jungles. *T. Cucumerina* is a prostrate creeper with a thin green wiry stem and alternate green, cordate leaves. The fruits are oval, having a smooth green surface with white streaks, and are about half the size of an egg.

The fruits borne on some plants have a pleasant taste, somewhat resembling that of cucumber, but in others it acquires a very bitter taste. It is ordinarily believed that if the fruit be eaten just as it is plucked, it has no unpleasant taste, but when kept for a while, even a few seconds, it acquires its bitterness; others more superstitious believe that so long as the name of the plant is not pronounced the fruit keeps well, but the instant the name is uttered it develops its unpleasantness! From observations made I find that some plants growing in jungles have naturally the bitter principle, whilst others growing in open grounds are devoid of it. In both cases it is increased by keeping the fruit after being plucked.

The importance of this plant is not much as a food product, but it is in great demand among the natives as a medicine. It has well-marked characteristics of a febrifuge, and is largely and successfully used in cases of fever.

43. *Cucumis Pubescens*, Wild Sin. Gonkekeri.

This plant is common in the low-country of Ceylon and grows wild in waste lands and on heaps of rubbish and roadsides. It is a creeper with thin tendrils. The stem is green and thin, and the whole plant is very hairy. The flowers are monoecious, and are borne in the leaf axils, the staminate flowers being very small with yellow corollas. Several pistillate flowers spring from the same axils, and hence it is not uncommon to find two to five of them in the same place, somewhat in the form of clusters. The full-grown fruits are about the size of the eggs of a house lizard, and are rounded in shape, green when not quite mature and attaining a scarlet colour when ripe. Before ripening, the small fruits possess a taste similar to cucumber, and are eaten by children; whilst in a ripe state they possess a bitter taste, but not altogether unpleasant.

44. *Cephalandra Indica*, Naud. Sin. Kowakka.

Is a plant common throughout the Island, and largely met with in higher elevations. It grows in waste places, and is a creeper with a thin green stem and cordate leaves much resembling the above-described variety. The leaf possesses a darker green colour and is not much covered with hairs. The fruit of this plant is considered to be poisonous, though much eaten by crows. The leaves are eaten especially in the upcountry in the form of dry curries, made with coconut and the usual curry stuffs.

45. *Zeheneria Umbellata,* Aru. Sin. Kavadu-kekeri.

This plant is generally found growing in wild places, but is rarely met with in cultivated grounds. It resembles much the *C. Pubescens* in its general characters, though the leaves of these plants look more succulent and a little larger in size. The fruits are larger resembling those of *T. Cucumerina,* but have not the bitter principle of that plant. They are eaten when obtainable.

The above-described varieties cannot strictly be reckoned as food products, as they are not much used as food.

Rubiaceae.

46. *Sarcocephalus Cordatus,* Miq. Sin. Bakmi.

Is a tree common in the warmer parts of the Island. It thrives generally in moist places, such as the banks of streams or ponds, and grows very high with many branches. The leaves are large, coarse, and rounded in shape with prominent nerves branching from the midrib to the margin almost at equal distances, but the general venation of the leaf is reticulated. The leaves and the epidermis of the soft parts of the stem are covered with coarse hairs. The infloresence of this plant is somewhat characteristic, the flowers being borne in a glomerulous capitulum, of the shape of a spherical ball. When the small flowers which have whitish yellow corollas open themselves, they give a most charming appearance to the tree. The compound fruits which are formed by these flowers also take a rounded shape. They are about the size of ordinary tomatoes. The fruits are covered with a dark brown epidermis with small black indentations, and consist of a yellowish fleshy mass which is hard and astringent when immature, and soft, and of a sweetish acid taste when ripe. The fruits are much eaten, and in some places they are sold in markets. A single tree bears a very large quantity of these fruits in a season.

The wood of this tree is of some value as timber, and the bark and young leaves are used medicinally in cuts, bruises, sores, boils and dislocations.

WATER-LIFTS. III.

By Aba.

The Double Mhote is an adaptation of the whim used in England for raising water and rubbish from mines, and in Australia for raising water for stock &c. It is said that the first machine of the kind was erected in India in the year 1869 from a model obtained from Australia. Since that time it has been much improved, and the following description of the action of the machine as it now exists on the Saidapet Farm is taken from the "Farm Manual," compiled by Mr. C. Benson, M.R.A.C., the former Superintendent of the Farm;—

"The water is raised by two leather buckets, similar to those in ordinary use in other parts of the Presidency; to each of these buckets is attached a rope which is fastened to a drum; one of these is coiled and the other uncoiled, as one bucket ascends and the other descends; the drum is fixed on a rotating spindle, to which is fixed at right angles the draught bar to which the bullock is attached; the diameter and thickness of the drum varies with the depth of the well; as a general rule, for all ordinary lifts the diameter of the drum may be equal to about one-fifth the number of feet that the water must be raissd; the drum is placed about 6 feet above the ground in order to allow the rope to pass over the head of the draught bullock; the spindle upon which the drum is placed is kept in its upright position by means of two beams, into which it is fixed, which cross each other at the middle, and are supported at the ends on posts placed opposite each other on the outer side of the bullock path. The bullock walks under the draught bar attached to a curved yoke, which turns on a swivel. In raising water the bullock travels round the upright spindle, thus turning the drum and winding one rope and unwinding the other. If the diameter of the drum is as suggested, $1\frac{1}{2}$ circuits around the path will raise each bucket to the requisite height; the bullock is turned round, facing the opposite direction, while each bucket is being discharged, no longer time is required to do this than is needed for the bucket to discharge its contents."

There is a model of the Double Mhote in the School Museum also sent from Madras by my friend, Mr. C. K. Menon, of the Saidapet Farm.

In my previous article on water-lifts I described the Single Mhote which is in use throughout India. To compare the two machines it will be seen that the "double" will raise about 30 per cent more of water than the "single" at a saving of about 50 per cent of the cost of lifting. But the Double Mhote has not yet come into general use, owing probably to the poverty of the ryot. The erection of the Single Mhote is within the power of every ryot almost, while the double requires the services of carpenters, and the outlay of a sum of money not within the reach of many a one.

NOTES FROM INDIA.

[Being translated extracts from letters by a Sinhalese Gentleman.]

The ryots of India are a more industrious lot than our Ceylon goiyas. At present there is a drought, such as we are having in Ceylon, prevailing in Southern India, but while the Indian ryots are irrigating their fields by means of wells, our goiyas are crying over their withering crops without adopting any remedy to save them. The practice of irrigation by wells is well worth a trial on the part of the Sinhalese cultivator. The Indian ryots irrigate even their coconuts, plantains, &c., when they suffer from want of moisture.

The paddy cultivators in India systematically adopt "transplanting" with paddy, and there is no doubt that this method produces superior results to that of ordinary broadcast sowing. As I travelled by rail I observed hundreds of acres of transplanted paddy. Why shouldn't the Ceylon goiya go in more for transplanting?

The peasant women of India are decidedly more devoted to agricultural work than our countrywomen.

Another thing that struck me from contrasting the natives of Ceylon with the natives of India is, how prone our people—both men and women—are to imitate foreign customs and foreign dress. This no doubt acts directly and indirectly as a great drawback to their agricultural pursuits.

In some of the waste lands I observed that the Indians plant *Casuarinas* (whip-trees), quick growing trees, the wood of which is sold as fuel to the Railway Companies. Here is a hint for the Ceylonese.

Madras, January 1891.

The Castor-oil plant is cultivated to a large extent in India. In some parts I saw gardens of twenty to thirty acres under this plant. It grows easily here, and the Indian ryots obtain good profits by its cultivation. A cwt. of castor-oil fetches from R13 to R18. The ryots prepare their land for castor-oil by ploughing; no manure is used, and the seed is sown broadcast.

Bombay, 7th January.

AGRICULTURAL SALT.

Prof. Thompson of Aspatria College appears as a vigorous advocate of salt for agricultural purposes. In an article on Agricultural Salt he enumerates a large number of references made to salt in connection with agriculture. In Luke chapter xiv, it is written, "Salt is good, but if the salt has lost its savour, wherewith shall it be seasoned? It is neither *fit for the land*, nor yet for the dung-hill; but men cast it out." Cato who died B. C. 150., says:—"When you lay up your straw, that which is most nutritious is to be laid under cover; sprinkle salt over it, then serve it for hay. If your sheep are scabby, take some lees of oil and water, in which lupines have been boiled and the dregs of good wine, mix them all together; when you have shorn your sheep anoint them all over, suffer them to sweat for two or three days, then wash them in the sea; if you are not near the sea make salt water and wash them with it. If you do this your sheep will not be scabby, they will have more fine wool, and the ticks will not molest them."

Virgil also bears undoubted testimony to the successful use of salt for cattle.

In 1638, Lord Bacon expressly mentions the benefits derived from watering various vegetables with a solution of salt and water. Sir Hugh Platt, in 1653, states "that it is salt which makes all seeds to flourish and grow, and that no dung which is laid on barren grounds would in any way enrich the same if it were not the salt in it."

In 1742 Professor Hoffman observes "that small pieces of fossil or rock salt were given to animals to keep away internal corruption and disease."

Dr. Brownrigg, in 1748, says:—"Salt is dispersed all over nature, it fertilises the soil, it arises in vegetables, and from them is conveyed into animals; so that it may well be esteemed the universal condiment of nature, friendly and beneficial to all creatures endowed with life, whether it be vegetable or animal. When properly used as a manure, it affords ample nourishment to corn and other vegetables, and renders kingdoms rich and fertile."

In 1817, Lord Kenyon, Sir Thomas Bernard, Bart., and Mr. Curwen (Workington Hall) bore testimony to its value as an admirable manure, and for cattle.

So that since the date of the New Testament the beneficial effect of salt on the land, the dung-hill and for sheep and cattle have been noticed in some parts of the world at least. Its value in cattle treatment is still recognised very generally, and the Ceylon Cattle Commissioners have strongly recommended its use in cases of murrain. In the agriculture of the country, however, it is little used. From the great solubility of common salt, it must be expected owing to the very great rainfall in many parts of Ceylon, especially in districts where the soil is overporous, that the greater part of the sodium chloride in the soil must be washed off in a tolerably limited period—the land thus "losing its savour." This washed-out condition of soils, as Mr. Thompson points out, will greatly facilitate the development of minute organisms, which, if not checked, attach and destroy our cultivated crops. It is difficult to think of a plant that has not some insect which affects it, for a great variety of inferior insects are nourished and live by their ravages on the vegetable world. For the destruction of a large number of lowlife forms there is nothing, says Mr. Thompson, so effective or so cheap as a judicious and plentiful application of crude crushed rock-salt. It is pointed out that wet seasons have always been known to generate and develope parasitic diseases in animals; and it may be noticed that insects injurious to plant life are favoured by the dampness and humidity resulting from such weather. It is therefore recommended that there should be a timely dressing of the lea lands and stubble with salt, previous to ploughing or turning up the soil, and before the ova of the future insects have had time to hatch and bring forth the larvæ or grubs, in which stage they are most destructive, so that a great many evils to plan and animal life may be averted. All lea and stubble lands Mr. Thompson suggests, should be dressed with 10 or 15 cwt. of crushed rock salt to the acre, previous to ploughing. This advice is especially applicable to cultivated land in tropical countries where insect life is so abundant.

Miss Ormerod, in her report issued last June, recommends the use of guano and salt for wheat infested with the maggot of the wheat bulb fly (*Hylemyia Coarctata*), because, she says, "Wheat having the power of imbibing salt until the plant tastes strongly of it, this application would be likely to be very detrimental to the young maggots feeding on the stems."

All this testimony goes to prove the value of salt in agriculture, and that it is very desirable that salt for agricultural purposes be placed more within the reach of cultivators in Ceylon.

COCA LEAVES (ERYTHROXYLON COCA).

By W. A. De Silva.

Owing to the medicinal priuciple (cocaiue) found in the leaves of this plant, it is being cultivated at the present day in many parts of the world. In Ceylon there are some species of Erythroxylxn, viz., the *E. Monogynum* and *E.*

Lucidum, which grow wild. Both these species are considered to possess certain medicinal properties, the former possessing properties very similar to that of coca, in as much that the leaves have the property of appeasing hunger.

The Erythroxylon Coca, or the plant from which cocaine is obtained, is a bush about four feet high with a small light geen leaf. The flower is white and the fruit a red berry. Herndon mentions, that in cultivating this plant, the seeds are sown in beds at the expiration of the rainy season. Arbors of palm trees are built over the young shoots to protect them from the sun, and they are watered, if it continues dry, for a week or so. The tree is transplanted a year and a half after planting, and gives its first crop in one year from that time, and a crop every four months after.

The bush if not destroyed by ants, will give crops for many years. Sometimes, but rarely, the leaves wither and the crop fails. The leaves should be dried when gathered, as quickly as possible. A hundred plants of coca are estimated to yield 20 lb. of leaves at a plucking.

The coca plant is likely to thrive in Ceylon, as the specimens growing in the Henaratgoda Tropical Gardens tend to prove.

About the properties of these leaves, Mr. H. F. Fish in a paper on the subject in the Technologist, mentions that when suppiled with an abundance of coca leaves, the Indian sometimes performs prodigies of labour and can go without food for several days; without it he is miserable and will not work. It is said to be a powerful stimulant to the nervous system, and like strong tea or coffee takes away sleep, but unlike tobacco and some other stimulants, no one has known it to be injured in health.

It is said that by taking a sufficient quantity of coca a man is capable of dispensing with food for 5 days without any material inconvenience, even though he be engaged in rapid travelling on foot the whole time. This leaf is highly valued by the inhabitants of Chili, Peru, and Bolivia, not only as a medicine, but also as an article of food, and serves with them as a substitute for the tea, coffee, betel, tobacco and opium used by other nations.

It has been established by experiments carried on by Dr. Mantegauza, as reported in the paper mentioned before, that the leaves of coca, chewed or taken in weak infusions, have a stimulating effect on the nerves of the stomach, and thereby greatly facilitate digestion. In a large dose coca increases the animal heat and augments the frequency of the pulse and consequently respiration. A medium dose, three or four drachms, excited the nervous system in such a manner that muscular exertion is borne with great ease, but afterwards produces a calming effect. Used in larger doses it causes delirium hallucination, and finally congestion of the brain.

GENERAL ITEMS.

The School of Agriculture opened on the 16th January. Out of a large number of applicants, some fourteen resident pupils have been chosen, besides four day scholars.

The harvesting of the paddy crop *(Sudu wi)* at the school was the first practical operation which claimed the attention of the students.

It is reported from Anuradhapura that the kurakkan crop has been much damaged by caterpillars.

A complete set of bones of a Ceylon bullock has been presented to the School Museum by Mr. Manchanayake, an old boy. This comes as a very opportune gift, which will be of great value to the Elementary Veterinary class—there being no *complete* skeleton of a bull or buffalo in any of the Museums in Colombo.

Mr. Menon, of the Agricultural College, Saidipet, has been writing to the *Ceylon Independent* recommending irrigation by wells for paddy cultivation in the dry parts of Ceylon. The letter has given rise to some discussion: some favouring, others throwing discredit on, the suggestion. Mr. Menon was for a time connected with the Colombo School of Agriculture, where he proved himself an able teacher, deeply learned in the science and art of agriculture.

Professor McConnel of Oxford, author of *The Agricultural Note-book*, has published a pamphlet on agricultural education. "My experience," says the Professor, "is that agricultural education of the proper sort enables a man to farm better and make more money than he would without it; if it does not do these things, then it is a mistake altogether, and the present movement had better stop where it is, and go no farther." In the Professor's view there are only four institutions in Great Britain which realise what he believes to be the best system of agricultural education. These four places are the Edinburgh University; the Normal School of Science, South Kennington; the Glasgow Technical College; and the University College of North Wales. The Professor has been brought to task for not including Aspatria College in Cumberland, which, while it has gained many distinctions of late at public examinations, is an institution which charges a very low scale of fees. It will be observed that Cirencester College, which was the 'fashionable resort' of agricultural students for a long time, is quite out of the reckoning.

Fourteen agricultural students, who successfully passed their examinations at the Nagpore School of Agriculture, have obtained posts as revenue inspectors.

Bamboo is considered, according to a Bangalore paper, the best material for making charcoal for blacksmith work, and is in large demand all over Mysore. It is said to give out more heat than the best coke and to require less blast. This bamboo charcoal fetches twice the price of the best charcoal of any other fuel. The method of charring bamboo is rather different from that used for harder woods—the stacks being carefully covered with green leaves and plastered with wet clay. While the burning is going on, care is taken to exclude air as much as possible without extinguishing the fire.

Says the *Indian Agriculturist*:—Lupins have been found very useful as binders and regenerators of sandy soils. *Lupinus luteus*, the scented yellow variety, is predominantly in use in

Middle Europe as a green manure to improve sandy soils; it is the best of all yet tested, and will do even for coast drifts. Lupin seeds are very fattening when used as an addition to ordinary fodder, and are in this respect quite equal to oil cake, while the hay is said to be not inferior to that of clover, and more bulky. Plants native to California, says the editor of the *I. A.*, ought to succeed fairly in Ceylon.

Dr. William Fream, B. Sc., has been appointed Steven lecturer in the University of Edinboro' for three years. Dr. Fream devotes his first year to the Science of Entomology in its bearings on agriculture.

Would we had such men in Ceylon as Mr. Lumsden, of Garmond, in Aberdeenshire, who has bequeathed £10,000 for the prevention of cruelty to animals.

Mr. Chaplin, the Minister of Agriculture in Great Britain, hopes to bring forward proposals which will entail some addition to the present grant for agricultural education.

A correspondent writing to the *N. B. Agriculturist* states that a section of an enormous tree is being taken out in the Mammoth Forest, California, the section being 9 feet high. The tree which grows 6,325 feet above sea level, measure 99 feet in circumference, and nearly 33 feet in diameter. The saw used in getting out the section is 22 feet long, and requires 8 men to handle it. Two months will be required to complete the work, and the weight of the section is expected to be not less than 20 tons.

A bulletin of the Maryland Experimental Station places great stress on the "testimony of plants" in the application of fertilizers. Pale green colour betrays a lack of nitrogen, or a red brown shade in the green of the leaves indicates that the slowness of their development, in spite of rain and sunshine, is a result of insufficient nourishment. A bright and deep green colour in almost all crops is evidence that nitrogen is not specially deficient, but no proof that more might not be used to advantage. Luxuriant growth and good crops of corn, cabbage, potatoes and grass shows a good natural supply of potash. If small grains produce well with the kernels, plump and heavy, phosphates cannot be especially needed. Simple experiments which any farmer can make for himself will show whether the soil is need of manures, and to what element of plant food it especially responds. On this branch of the subject—what plant food to buy and what quantity—Prof. Magner's conclusions are substantially as follows:—Phosphoric acid and potash should be used liberally, and with reference to the needs of the soil rather than the demands of the crops. These food constituents should be applied in excess of the needs of the plants. In this there is no danger of waste of potash and phosphoric acid, substances which the soil binds up and preserves for later crops in case the one immediately following demands them only partially or not at all. Consequently, as to these two, they may safely be applied till present in sufficient surplus; that is till a further application is without effect. The greatest profit results in holding the soil in this degree of food surplus as to phosphoric acid and potash. With nitrogen it is quite different; this is not found to be retained by the soil, and although temporarily held it is freely moveable. Any residue from the wants of a crop to which it has been applied, is in danger, especially during the winter months, of being washed into the sub-soil and lost. Hence nitrogen should be measured out as accurately as possible according to the needs of the plant for which it is particularly applied.

Copper in Cereals.—Writing to the *Lancet* on this subject, Mr. Wm. Johnstone, Ph. D., &c., says:—"This question has very lately been prominently brought under my observation, and that in a novel and unexpected manner, necessitating the examination of a large number of samples of wheat and barley, which resulted in 15 per cent. of the samples being found to contain copper in more or less quantity, particularly in the Scotch barley. The existence of copper in cereals, therefore, becomes a serious question, especially to manufacturers of infants' food, as they are liable at any moment to have proceedings instituted against them under the Sale of Food and Drugs Act. It was due to legal proceedings being threatened against a manufacturer of infants' food which caused the matter to be placed in my hands. The plantiff's analyst certified that the food contained lead, which had caused serious illness to an infant; but upon closer investigation by myself, it proved to be copper, and it was present there as a natural constituent of one of the cereals used in the preparation of that particular infants' food. Granting that cereals do possess the remarkable property of taking up copper from the soils in which they are grown, provided that soil contains copper, the question immediately arises, What is the maximum amount of copper which barley or wheat is capable of taking up? Few soils in this country contain copper to any appreciable extent. I am therefore inclined to attribute the presence of copper in Scotch barley and English wheat to the prevalent practice of dressing the grain and also the ground with sulphate of copper, so as to protect it from the ravages of vermin after the grain is sown. The possible existence of copper in cereals may also account for some of those mysterious and unaccountable cases of illness which occur from time to time in families, and is therefore well worth the attention of medical practitioners, and also that of the manufacturers of infants' food."

E. T. H. received with thanks: will appear in our next.